June 3, 2005

REGARDING PATENT APPLICATION 10/732,857

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Dear Brian,

Please find enclosed a 47 page Claims Discussion vs 20040091201 and a 48 page Claims Discussion vs 20040037708. Please notice that the footer has the page number and a label with the patent application numbers that each discussion addresses.

Thank you for your help in these matters,

Very truly yours,

Gary Poovey PhD

Claims discussion vs 20040091201

Introduction:

In this document, the claims given in Patent Application 10/732,857 entitled the LIGHT TRIGGERED LIGHT SWITCH will be shone to be unique and different from the claims given in United States Patent Application number 20040091201 entitled the OPTICAL MICRO-ACTUATOR, OPTICAL COMPONENT USING THE SAME, AND METHOD FOR MAKING AN OPTICAL MICRO-ACTUATOR. This will be called the OPTICAL MICRO-ACTUATOR as it is in the patent application to save paper and ink. The following Table 1 allows a comparison of the two inventions.

Compare	20040091201	10/732,857
Not same	No transparent piezoelectric mentioned	Transparent piezoelectric is claimed
Not same	Reflection, transmission, refraction, or attenuation switch	On and off switch
Not same	A light channel that has a fluid interface moved in and out of the optical channel	A light channel that closes in time as the piezoelectric material swells under the action of the electric field of light
Not same	Fluid allows light transmittion	Channel is large enough for light to pass
Not same	The fluid interface reflects, refracts, or attenuates the light	Channel is too small so light is stopped
Not same	Electrical control signal applied	Light electrical power
Not same	Control signal moves the interface between optical fluids	Piezoelectric responds to light power changes the dimensions of the channel
Not same	Electrostatic control, voltage generators, electrostatic motors, electric circuits	No electrostatic control, No voltage generators, No motors, No circuits
Not same	Refraction index often sited	Refraction index never mentioned
Not same	Interface of optical fluids	Interface of piezoelectric & light channel
Notes	Signal speed slower than 10^{-9} sec	Light faster than 10^{-11} seconds
Notes	Present technology, no better	More than 100 times faster, much better

Table 1.

In brief, THE LIGHT TRIGGERED LIGHT SWITCH is an on/off switch, and uses the power of light in or near the channel to actuate the switch, and the OPTICAL MICRO-ACTUATOR is not an on/off switch, and does not use the power of the light in or near the channel to actuate the switch. The discussion below works with the words of each patent clearly exposing the differences between these two inventions so that the superior technology of the LIGHT TRIGGERED LIGHT SWITCH may receive the patent protection that it disserves.

Claims discussion:

LIGHT TRIGGERED LIGHT SWITCH Claim 1:

1. The first words of Claim 1 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light in a channel"

In the OPTICAL MICRO-ACTUATOR is not referred to as an on and off switch. U.S. Patent application number 20040091201 never refers to the invention as an on and off or on-off switch.

In the OPTICAL MICRO-ACTUATOR application in paragraph 0025 optical properties for the optical fluids used in the actuator may be reflection, transmission or refraction, but the light is not shut off as it is in the LIGHT TRIGGERED LIGHT SWITCH when the piezoelectric material makes the channel too small.

In the OPTICAL MICRO-ACTUATOR application, in paragraph 0077 optical properties for the optical fluids used in the actuator may be

attenuated if opaque fluids are used, but the light is not shut off as it is in the LIGHT TRIGGERED LIGHT SWITCH when the piezoelectric material makes the channel too small.

Clearly the OPTICAL MICRO-ACTUATOR is not an on and off switch as the LIGHT TRIGGERED LIGHT SWITCH is.

2. The second words in Claim 1 in the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"a channel comprising a transparent piezoelectric light channel"

Nowhere in patent application 20040091201 is a transparent piezoelectric light channel mentioned. An "Other control means, for example piezoelectric, magnetic, thermal, pneumatic means, etc.," is mentioned in paragraph 0034, but the piezoelectric would put pressure on the fluids so that the interface moves across the light channel. They do not have to be transparent since they are not part of the light channel or waveguide as is claimed in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH. In patent application 20040091201, in paragraph 0117 piezoelectric is mentioned, "using microelectronics techniques (for example, electromagnet or piezoelectric actuator)." Again, this piezoelectric actuator would put pressure on the fluids so that the interface moves across the light channel. They do not have to be transparent since they are not part of the light channel or waveguide as is claimed in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH.

In paragraph 0003, it is explained that an OPTICAL MICRO-ACTUATOR would modify a light beam in response to a "control signal." The "control signal" would be what turns on the piezoelectric actuator.

Control signals can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster at a one hundred billionth of a second.

Nowhere in the claims of patent application 20040091201 is a piezoelectric element mentioned.

3. The next words in Claim 1 of the disclosure of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"light channel that is made
A larger in cross section
B smaller in cross section"

The light channels or waveguides in patent application 20040091201 which teaches OPTICAL MICRO-ACTUATOR are not described as getting larger or smaller in the claims or the disclosure, instead the interface between two optically different fluids is moved into the light channel at a cavity numbered 30 in the figures. This cavity of the OPTICAL MICRO-ACTUATOR is not made smaller or larger as the light channel is in the LIGHT TRIGGERED LIGHT SWITCH.

4. The next words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"by the action of the electric field of light passing through the channel"

Nowhere in the patent application 20040091201 is the electric field of the light in the channels referred to.

In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH the DETAILED DESCRIPTION OF THE INVENTION, the second sentence teaches that the electric field of the light acts upon the piezoelectric material to make the switch actuate. From that second sentence on through mathematical calculations with the Poynting vector equation, that is used to explain the way the electric field of the light in the channel actuates the piezoelectric material causing it to expand or contract, and on into the description of each drawing, the light power is triggering the switching.

By actuating a switch with the electric field of the light, switching speeds of less than one hundred billionth of a second (10^{-11}) can be achieved. By actuating a switch by the "electrostatic control means" of claim 1 or "electrostatic motor" of claim 13 or "voltage generator" numbered 58 in figure 1 of the OPTICAL MICRO-ACTUATOR, switching speeds of a billionth of a second 10^{-9} are the fastest that can be achieved. In paragraph 0083, the silicon membrane is said to have a resonant frequency of 100kHz. This membrane would move back and fourth one hundred thousandth of a second (10^{-5}). This is much slower than even transistors can achieve. It is seen that the LIGHT TRIGGERED LIGHT SWITCH of patent application, 10/732,857 far faster and far superior to the OPTICAL MICRO-ACTUATOR, and the LIGHT TRIGGERED LIGHT SWITCH is deserving of patent protection.

5. The next words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows in the A and B portions:

"A by opening to the passage of the light signals
B by closing to the passage of the light signals"

The claims for patent application 20040091201 present the waveguides encountering the cavity that the fluid interface moves in reflecting, reflecting, or attenuating the light signals. This switch changes the direction of the light; it does not close to the passage of light signals, as does the LIGHT TRIGGERED LIGHT SWITCH.

6. The last words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows in the A and B portions:

"A for the switch to be in the on condition
B for the switch to be in the off condition."

The switch being described is an on and off switch. This is different from the OPTICAL MICRO-ACTUATOR, which changes the light signal by reflecting, reflecting, or attenuating.

OPTICAL MICRO-ACTUATOR Claim 1:

1. The first words of Claim 1 in Patent application 20040091201 read as follows:

"Optical micro-actuator comprising a cavity (30) formed between at least one optical input channel (12, 12a, 12b) and at least one optical output channel (14, 14a, 14b),"

The whole object of the OPTICAL MICRO-ACTUATOR is to reflect the light into the second channel or alter the light before going into the second channel, while the LIGHT TRIGGERED LIGHT SWITCH teaches how the electric field of the light can shut off the light passing through the switch.

The second words of Claim 1 in the OPTICAL MICRO-ACTUATOR are as follows:

"the cavity being capable of containing at least one first optical fluid and one second optical fluid (32, 33, 34, 35), with at least one different optical property,"

The cavity is crossed by the optical channels. The optical channel passing through the cavity and interact with the surface of the interface between the two optical fluids. As the light hits the interface between the two optical fluids the light is transmitted, refracted, reflected, or attenuated that the switch is designed to do to the light in the channel. When the interface is not in the way of the light the light passes through the OPTICAL MICRO-ACTUATOR with out being affected. In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH one finds described the wall of the waveguide closes in to shut off the light signal (Figure 1B, 2B, and 3B).

2. The next words of Claim 1 in the OPTICAL MICRO-ACTUATOR are as follows:

"and means of modifying the position of an interface between the first and second optical fluids with respect to the optical channels,"

The interfaces between the two optical fluids move in the cavity affecting the light passing through the optical channels. The walls of the cavity or the optical channel do not change to a different dimension as do the sides of the waveguide in the LIGHT TRIGGERED LIGHT SWITCH (Figure 1B, 2B, and 3B). The walls of the cavity of patent 20040091201 are at an angle from the optical channel path (Figure 14). The thing that changes in an OPTICAL MICRO-ACTUATOR is the interface between optical fluid one and the second optical fluid. The light passes straight through the LIGHT TRIGGERED LIGHT SWITCH when the power of the light in or near the waveguide path is week and the voltage in it is not sufficient to bend the walls of the channel. Clearly, these two switches function in completely different ways.

3. The next words of the Claim 1 in the OPTICAL MICRO-ACTUATOR are as follows:

"in which the means of modifying the position of the interface comprise at least one chamber (40, 41, 43) containing at least one fluid in fluid contact with the cavity (30),"

Modifying the position of the interface between the optical fluids is the way the OPTICAL MICRO-ACTUATOR changes the light that it transmits, reflects, refracts, or attenuates. In the LIGHT TRIGGERED LIGHT SWITCH, light in or near to the wageguide or light channel is of sufficient power to cause the piezoelectric material in the switch to change dimensions so that the light can no

longer pass through the channel. That is as is claimed in Claims 1, 2, and 3 of the LIGHT TRIGGERED LIGHT SWITCH. Clearly, these switches described in patent 20040091201 and those in application 10/732,857 function completely differently.

4. The next words of Claim 1 in the OPTICAL MICRO-ACTUATOR are as follows:

"and electrostatic control means (44, 46, 80) to modify the volume of the chamber."

Here it is the "electrostatic control means" causing the interface between the two optical fluids to move by changing the volume of the chamber. In paragraphs 0003 and 0032, it is clear that this electrostatic control means is run by a "control signal."
Here it is the "control signal" causing the interface between optical fluid one and two to move to the cavity. This is the same as the electrical signal mentioned in Description of the Prior Art part of Application 10/732,857 where United States Patent number 6,594,411, which teaches OPTICAL SWITCH, and is issued to Yueh Liang Chung etal. On July 15 of 2003, is referenced. Patent 6,594,411 makes mention of a piezoelectric element. The piezoelectric element is actuated by an electrical signal. Again, a manual switch, relay, solenoid, or transistor must switch an electrical signal or "control signal." The fastest of these is the transistor, which can switch in a billionth of a second (10^{-9} seconds). In the LIGHT TRIGGERED LIGHT SWITCH, the light in the channel crosses the switch dimensions in 10^{-13} seconds or faster depending on the size of the switch. Making the LIGHT

TRIGGERED LIGHT SWITCH far superior in design that patent 6,594,411 or patent application 20040091201, because the piezoelectric elements the switches claimed in the claims of application 10/732,857 responds to the electric field of the light passing through the waveguide of the switch. The response of the piezoelectric elements in the LIGHT TRIGGERED LIGHT SWITCH can easily cause the switch to turn on and off faster than 10^{-11} seconds.

LIGHT TRIGGERED LIGHT SWITCH Claim 2:

1. The first words of Claim 2 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light in a channel comprising a channel next to a piece of piezoelectric material"

Patent 20040091201, which teaches OPTICAL MICRO-ACTUATOR, has only one independent claim about the function of the actuator, which is the first one. The other independent claims deal with the construction of OPTICAL MICRO-ACTUATORs. Claim 2 in the LIGHT TRIGGERED LIGHT SWITCH is an independent claim and must be compared against Claim 1 of the OPTICAL MICRO-ACTUATOR. The argument will be the same as was presented for Claim 1 in Application 10/732,857. The difference is that the switch described in Claim 2 has no transparent piezoelectric member that carries the light. The piezoelectric member is next to a transparent material that is carrying the light signal, and the light that causes the piezoelectric member to change shapes and closes the channel down. The piezoelectric material used may be transparent, but there are less expensive piezoelectric materials that

are not transparent that can be used in a switch that is made as this claim describes.

2. The second words in Claim 2 in the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"where the channel carrying the light is made

A. larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material

B. smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

The switch described here like the one described in Claim 1 the light signal is stopped from passing through the switch because the electric field of light in the waveguide or channel is causing the piezoelectric material of the switch to move. The movement of the piezoelectric material opens up or closes down the channel to the light. This opening or closing causes the on or off of the switch, because light cannot go through a channel that is as small as a quarter of its wavelength. The switch described in patent application number 20040091201 moves the interface between two optical fluids into a cavity to accomplish the transmission, reflection, refraction, or attenuation of the light into an alternative optical channel.

These are two very different means of switching. The LIGHT TRIGGERED LIGHT SWITCH will switch faster than a hundred billionth of a second. The OPTICAL MICRO-ACTUATOR will not be able to achieve switching in less than a billionth of a second. In this switch, the waveguide that is made smaller as the piezoelectric material gets bigger must be made out of a flexable material so that it can respond to the pressure of the piezoelectric material.

3. The next words in Claim 2 of the disclosure of the Light Triggered Light Switch are as follows:

"A. that by contracting opens the light carrying channel to light signals causing the on condition
B. that by expanding into the light carrying channel closes the light channel to light signals"

Divoux et. al. in patent application 20040091201 which teaches OPTICAL MICRO-ACTUATOR has a cavity that the interface between two optical fluids move because a control signal actuates a electrostatic control means. Application 11/732,857 has piezoelectric material that in a very short time change their dimensions to close off a light channel in response to the electric field of light. These are two very different means of operation, and Application 11/732,857 is superior because it can switch more than 100 times faster.

4. The next words in Claim 2 of the disclosure of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"A. causing the on condition
B. causing the off condition"

The LIGHT TRIGGERED LIGHT SWITCH claims to be an on/off switch. Nowhere in the claims of Patent number 20040091201 is on and off mentioned. The LIGHT TRIGGERED LIGHT SWITCH stops light from continuing down a waveguide or channel. The OPTICAL MICRO-ACTUATOR transmits, reflects, refracts, or attenuates in passing from one channel to another.

OPTICAL MICRO-ACTUATOR Claim 2:

Claim 2 in Divoux et. al. U.S.P. application 20040091201 read as follows:

"Optical micro-actuator according to claim 1, in which the means of modifying the volume of the chamber comprise a deformable membrane (44, 45) forming a wall of the chamber."

This claim deals with a deformable membrane that changes the volume of the chamber filled with optical fluid to move the interface of the fluid in the switch into the cavity so the light will be transmitted, reflected, refracted, or attenuated in passing through the fluid filled cavity. There is an electrical signal that actuates the deformation of the membrane. The electrical signal will be switched on or off by some means previously invented like a hand switch, a solenoid, a relay, or a transistor. The fastest of these is a transistor, which can at the fastest switch in a billionth of a second (10^{-9}), and then the diaphragm must move the fluid. A hundred millionth (10^{-8}) or a ten millionth (10^{-7}) of a second is the fastest that the OPTICAL MICRO-ACTUATOR can hope to switch. The LIGHT TRIGGERED LIGHT SWITCH is turned on or off by the electric field of light. The LIGHT TRIGGERED LIGHT SWITCH will switch faster than a hundred billionth of a second (10^{-11}) at the slowest. The LIGHT TRIGGERED LIGHT SWITCH can switch in a ten trillionth of a second (10^{-13}), if one chooses the proper wavelength to do the switching. The LIGHT TRIGGERED LIGHT SWITCH is clearly superior to the OPTICAL MICRO-ACTUATOR and should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 3:

1. The first words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light signals in a channel comprising a compressible fluid portion of the channel with a side that is composed of a piezoelectric material"

The arguments for this claim are the same as for Claim 2. The difference is that the material of the waveguide that the piezoelectric part moves into a compressible fluid instead of compressing a solid. Figure 3 A and B show the compressible fluid before and during response to the electric field of the light in the channel. No interface between fluids is moved in the LIGHT TRIGGERED LIGHT SWITCH where in the OPTICAL MICRO-ACTUATOR as seen in Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 the interface between the optical fluids is moved. The speed of the LIGHT TRIGGERED LIGHT SWITCH comes from the response of the piezoelectric crystal to the electric field of the light. The reason the OPTICAL MICRO-ACTUATOR is so much slower is that signals switched in transistors or slower mechanisms must mechanically or thermally push the interface between two optical fluids around to effect the switching. The LIGHT TRIGGERED LIGHT SWITCH is more than 100 times faster.

2. The second words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"piezoelectric material that responds to the electric field in the light in the channel to

A. Contract the piezoelectric wall of the channel to open up
B. Expanding into the light channel to close"

As is illustrated in Figures 3A and 3B the LIGHT TRIGGERED LIGHT SWITCH associated with Application 10/732,857 uses the response of piezoelectric material to the electric field of light to open up or close down the dimensions of the light channel so that light can pass through it or is too small for the light to pass through it. As is illustrated by Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 of the OPTICAL MICRO-ACTUATOR, which is has been given patent application number 20040091201, the modification of the light in the light channel is effected by the manipulation of the interface of two optical fluids into the path of the light signal that is to be switched. These are two different mechanisms. The speed with which invention described in Application 10/732,857 can switch the signal off is much faster than the invention described in patent application number 20040091201 can, because the electric field of light is switching the LIGHT TRIGGERED LIGHT SWITCH. The OPTICAL MICRO-ACTUATOR depends upon a "control signal" (mentioned in paragraph 0003), which is turned on by a hand switch, solenoid, relay, or transistor to send electricity to push the interface between two optical fluids. The transistor switch would be the fastest at 10^{-9} seconds (that is a billionth of a second). The signal then must cause piezoelectric material to put pressure on the optical fluids or the micromechanical device to put pressure on the optical. These operations make the switch slower than the transistor. Actually the speed that this switch will only be able to switch at 10^{-7} seconds (that is a ten millionth of a second). The LIGHT TRIGGERED LIGHT SWITCH will switch faster than 10^{-11} seconds (that is a hundred billionth of a second). If the proper wavelength is used the LIGHT TRIGGERED LIGHT SWITCH could switch at 10^{-13}

seconds (that is a ten trillionths of a second). It is seen that the LIGHT TRIGGERED LIGHT SWITCH is not the same as the OPTICAL MICRO-ACTUATOR, and the LIGHT TRIGGERED LIGHT SWITCH is superior and should be granted patent protection.

3. The last words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

A. " the channel to larger dimensions so that the light signal easily passes through the channel causing the on condition.
B. the light channel to smaller dimensions so that the light signal may not pass through the channel causing the off condition."

These words show that the way that the LIGHT TRIGGERED LIGHT SWITCH turns off the light is by the dimensions of the channel is wider to let the light through or the dimensions of the channel is smaller to stop the light from passing through the channel. It is pointed out in the DETAILED DESCRIPTION OF THE INVENTION section of Application 10/732,857 that when a light channel or waveguide is shrunken to a given dimension then light of 8056 angstroms will no longer pass through it. Lights of shorter wavelength can still pass through it. The 8056 angstrom or longer wavelength light would be the one that is the signal that is switched on or off. The light that is doing the switching could be shorter wavelengths that can still pass and their electric field is effecting the change in dimensions by acting on the piezoelectric material. This specific example is given to teach that the light of specific wavelength and power will switch on or off a signal in an other specific wavelength. Light is fast and is capable of turning on or off a light signal much faster than the moving the interface of the

optical fluid described in Divoux et. al., U.S.P. Application No.20040091201 column 5 lines 34 to 50.

OPTICAL MICRO-ACTUATOR Claim 3:

Claim 3 in Divoux et. al., U.S.P. Application No 20040091201 read as follows:

"Micro-actuator according to claim 2, comprising a first electrode fixed to the deformable membrane (44) and a second electrode fixed to a rigid support (46) placed facing the first electrode."

It is the voltage that will be applied between the first and second electrode is what switches the OPTICAL MICRO-ACTUATOR, and the control signal of paragraph 0003 will turn on this voltage. The fastest this method of switching is going to be able to switch in 10^{-7} seconds or 10^{-8} seconds because a hand switch, solenoid, relay, or a transistor will turn on the "control signal." The fastest of these is the transistor switching in 10^{-9} seconds. This is very different from the words of Application 10/732,857 for the LIGHT TRIGGERED LIGHT SWITCH. Which are as follows: "the action of the electric field of light" that is used in Claim 1, or "action of the electric field of the light" that is used in Claim 2, or "responds to the electric field in the light" that is used in Claim 3, or "actuated by the power of the switching light" that is used in Claims 4, 5, and 6, or "that responds to the electric field of the light" that is used in Claim12. The LIGHT TRIGGERED LIGHT SWITCH will be able to be switched in 10^{-11} seconds or faster. This much faster switch should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 4:

The words of the Claim 4 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light, which is the same wavelength as the light signal in the channel that is switched on and off."

This claim teaches that light that is of sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be of the same wavelength as the light signal that is in the channel that the switch is used to turn on or shut off. The electric field of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201 the power of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRYING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be expected from a piezoelectric element from a specific power of light in watts. Clearly, these are different inventions.

OPTICAL MICRO-ACTUATOR Claim 4:

1. The first words of Claim 4 in Divoux et. al., U.S.P. Application No 20040091201 read as follows:

"Micro-actuator according to claim 2, in which the membrane (44) has a free surface the area of which is greater than the area of one section of the cavity."

This claim teaches that the membrane is larger in surface area than the cross section of the cavity so that when the membrane moves a little the interface between the two optical fluids moves a longer distance in the cavity. The movement of this interface is the action of the OPTICAL MICRO-ACTUATOR. Figures 1A, 1B, 2A, 2B, 3A, and 3B show that the light signals in the LIGHT TRIGGERED LIGHT SWITCH travel along the light switch that is actuated by the movement of the piezoelectric element acted upon by the electric field of the light in the waveguide. These switches operate on completely different principals.

LIGHT TRIGGERED LIGHT SWITCH Claim 5:

The words of Claim 5 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light, which is a shorter wavelength than the light signal in the channel that is switched on and off."

This claim teaches that light that is sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be a shorter wavelength than the light signal that is in the channel that the switch is used to turn on or shut off. The electric field of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201. The power of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRYING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be

expected from a piezoelectric element from a specific power of light in watts. Clearly, these are different inventions.

OPTICAL MICRO-ACTUATOR Claim 5.

1. The first words of Claim 5 in the OPTICAL MICRO-ACTUATOR patent are as follows:

"Micro-actuator according to claim 1, in which it the chamber comprises at least one flexible wall and contains at least one substantially incompressible fluid (31, 32)."

The flexible wall and the incompressible fluid allows the OPTICAL MICRO-ACTUATOR to move the interface between the two optical fluids in the cavity across the path of the light passing from the optical channel on one side of the cavity to the other. This is a very different mechanism than is described in Claims 1, 2, and 3 of the LIGHT TRIGGERED LIGHT SWITCH that teach that the physical dimensions of the light channel are opened up or closed off by the action of the electric field of the light on piezoelectric elements.

LIGHT TRIGGERED LIGHT SWITCH Claim 6:

1. The words of Claim 6 of the LIGHT TRIGGERED LIGHT SWITCH application read as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light,"

This claim teaches that light that is of sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be a

shorter wavelength than the light signal that is in the channel that the switch is used to turn on or shut off. The electric field of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201. The power of light is never mentioned in Divoux et. al., U.S.P. Application No 20040091201. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRYING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be expected from a piezoelectric element from a specific power of light in watts. Clearly, these are different inventions.

2. The next of Claim 6 of the LIGHT TRIGGERED LIGHT SWITCH application reads as follows:

"which is a longer wavelength than the light signal in the channel that is switched on and off"

This claim teaches that the light signal that is switched on or off can be switched on or off by a light signal that is longer in wavelength. Claim 4 and 5 teach that the light signal that is switched on or off can be switched on or off by a light signal that is the same or a shorter wavelength than the light signal that is being switched on or off. This switching by light is the key advantage of this the Application 10/732,857, which teaches LIGHT TRIGGERED LIGHT SWITCH. Light is so much quicker than control signals. Patent Application number 20040091201 is turned on or off by a "control signal" as is seen in paragraph 0003. These two inventions are very different in their action.

OPTICAL MICRO-ACTUATOR Claim 6.

The words of Claim 6 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, in which the chamber has rigid walls, and contains at least one compressible fluid."

The incompressible fluid needed for moving the interface of two optical fluids into the path of light passing through the cavity so that the light signal will be transmitted, reflected, refracted, or attenuated by the interface of the two optical fluids. The light signal would have crossed the cavity when it was filled with the liquid. This is a very different mechanism than is described in Claims 1, 2, and 3 of the LIGHT TRIGGERED LIGHT SWITCH that teach that the physical dimensions of the light channel are opened up or closed off by the action of the electric field of the light on piezoelectric elements. The LIGHT TRIGGERED LIGHT SWITCH is very different from the OPTICAL MICRO-ACTUATOR and should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 7:

The words of Claim 7 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim one where the piezoelectric material is transparent to the light passing through it."

There are many materials mentioned in Application 10/732,857 that are piezoelectric these are quartz (SiO_2), lithium niobate ($LiNbO_3$), lead zirconate ($PbZrO_3$), lead titanate ($PbTiO_3$), and lead zirconate titanate. Lead zirconate titanate is also called PZT. Of these

lithium niobate and quartz are transparent. In Claim 1 of the Light Triggered Light Switch the light channel is composed of transparent piezoelectric material and changes dimensions as the switching light signal acts upon it as Figures 1A and 1B illustrate. Nowhere in Patent 20040091201 is a transparent piezoelectric element mentioned. Nowhere in Patent Application 20040091201 does a light channel change physical dimensions. The light of Patent Application 20040091201 show that the light channels cross the cavity where they either go through optical liquid one or are transmitted, reflected, refracted or attenuated by the interface of the two optical fluids. The piezoelectric element referred to paragraph 0034 is in a list including magnetic, thermal, and pneumatic means indicating that other control means can be used to move the interface between the optical fluids in patent application 20040091201 these would all be is actuated by a "control signal" spoken of in paragraph 0003 and, as has been discussed, is slow relative to the LIGHT TRIGGERED LIGHT SWITCH. The same is true of the reference to piezoelectric actuator in paragraph 0117. Here it is listed with an electromagnet indicating alternative methods for moving the wall of the fluid filled chamber. These would all be is actuated by a "control signal" spoken of in paragraph 0003 and, as has been discussed, is slow relative to the LIGHT TRIGGERED LIGHT SWITCH which is actuated by the voltage in light in the optical channel. The voltage of light is not mentioned in patent application 20040091201.

OPTICAL MICRO-ACTUATOR Claim 7.

The words of Claim 7 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, comprising a plurality N of optical input channels (12a, 12b) and a plurality M of optical output channels (14a, 14b), in which each optical input channel may be selectively connected to at least one of the optical output channels through the cavity."

This claim makes clear that the action of the OPTICAL MICRO-ACTUATOR is diverting light from one channel into another. The interface between two optical fluids is moved to the cavity and the light is reflected. This is not how the LIGHT TRIGGERED LIGHT SWITCH works. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"light channel that is made
A larger in cross section by opening to the passage of the light signals
B smaller in cross section by closing to the passage of the light signals"

In Claim 2 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"where the channel carrying the light is made
A.larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material
B.smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

In Claim 3 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"A. Contract the piezoelectric wall of the channel to open up
B. Expanding into the light channel to close"

The two switches function differently. Patent 20040091201 teaches the moving of the interface between two optical fluids to divert light, while Application 10/732,857 teaches the optical waveguide is physically made large enough or pinched down to be too small to turn on or shut off the light.

LIGHT TRIGGERED LIGHT SWITCH Claim 8:

The words of Claim 8 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a gas"

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of an interface between two optical fluids being pushed around so that light will bounce off of it as is illustrated in Figures 1, 2A, 2B, 9, 10, 12, 13, 14, 15, and 16 of Divoux et. al., U.S.P. Application No. 2004009120. The reason there is no mention of an interface between two optical fluids in the application of the LIGHT TRIGGERED LIGHT SWITCH is that the function of the two switches is completely differently.

OPTICAL MICRO-ACTUATOR Claim 8.

The words of Claim 8 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, comprising at least one first optical guide forming at least one input channel and at least one second optical guide forming at least one output channel."

Divoux et. al., U.S.P. Application No. 20040091201 teaches that these optical waveguides come into the cavity where the interface between two optical fluids transmit, reflect, refract, or attenuate the light signal passing through the light channels. These changes in the light by interacting with the interface between two optical fluids are the way that patent application 20040091201 switches. The switching function of the OPTICAL MICRO-ACTUATOR is controlled by the change in the position of the interface between two optical fluids in the cavity in the switch. This is very different from what Application 10/732,857 describes as the function of the switch that it teaches. An interface between optical fluids is never mentioned in Application 10/732,857. An interface between two optical fluids has nothing to do with the function of the LIGHT TRIGGERED LIGHT SWITCH. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"light channel that is made
A.larger in cross section by opening to the passage of the light signals
B.smaller in cross section by closing to the passage of the light signals"

In Claim 2 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"where the channel carrying the light is made
A. larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material
B. smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

In Claim 3 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"A. Contract the piezoelectric wall of the channel to open up
B. Expanding into the light channel to close"

The two switches function differently. Patent 20040091201 teaches the moving of the interface between two optical fluids to divert light, while Application 10/732,857 teaches the optical waveguide is physically made large enough or pinched down to be too small to turn on or shut off the light.

LIGHT TRIGGERED LIGHT SWITCH Claim 9:

The words of Claim 9 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a mixture of gases."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH show the area that the piezoelectric part of the switch responds to the

electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of interface between two optical fluids being pushed around so that light will bounce off of it as is illustrated in Figures 1, 2A, 2B, 9, 10, 12, 13, 14, 15, and 16 of Divoux et. al., U.S.P. Application No. 20040091201. The reason there is no mention of an interface between optical fluids in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different.

OPTICAL MICRO-ACTUATOR Claim 9.

1. The first words of Claim 9 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, in which the chamber contains at least one fluid chosen from among the first and second optical fluids (32, 34)"

This claim teaches about the two optical fluids the interface between which is pushed into the path of the optical signals in the optical channels in the cavity. An interface between optical fluids is never mentioned in Application 10/732,857. An interface between two optical fluids has nothing to do with the function of the LIGHT TRIGGERED LIGHT SWITCH. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"light channel that is made
A.larger in cross section by opening to the passage of the light signals

B.smaller in cross section by closing to the passage of the light signals"

The way that the two switches function completely differently.

2. The final words of Claim 9 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"and/or at least one driving fluid (31) with or without direct contact with at least one of the first and second optical fluids."

This portion of claim nine of Divoux et. al., U.S.P. Application No. 20040091201 teaches about the driving fluid that pushes the optical interface between the first and second optical fluids into the cavity where the light signal is affected by the switch. The driving fluid transfers the pressure that is applied by the "Other control means, for example piezoelectric, magnetic, thermal, pneumatic means, etc.," is mentioned in paragraph 0034, that would be actuated by a "control signal" as mentioned in paragraph 0003. The pressure might also be put on the driving fluid by "electrostatic control means" mentioned in paragraph 0078 and 0103 and 0107, which would be activated by a "control signal" As would the "electrostatic motor" of paragraph 0117. These "control signals" can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster at a one hundred billionth of a

second, because it uses the electric field of light to actuate the switch.

LIGHT TRIGGERED LIGHT SWITCH Claim 10:

The words of Claim 10 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a liquid."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of a interface between two optical fluids being pushed around so that light will bounce off of it as seen in Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 of Divoux et. al., U.S.P. Application No. 20040091201. The reason there is no mention of an interface between two optical fluids in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different. The light channel is closed down by the movement of the piezoelectric element responding to the voltage of the light in the channel.

OPTICAL MICRO-ACTUATOR Claim 10.

1. The first words of Claim 10 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, in which the chamber comprises a bladder (43)"

Compressing the bladder to move the interface of the two optical fluids to interact with the light passing through the cavity requires a "control signal" as the patent application for the OPTICAL MICRO-ACTUATOR mentions in paragraph 0003. This control signal can be turned on by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds. The LIGHT TRIGGERED LIGHT SWITCH can switch in 10^{-13} seconds because it is switched by the power in the light in the light channel. The LIGHT TRIGGERED LIGHT SWITCH is clearly 10000 times faster than the OPTICAL MICRO-ACTUATOR and is therefore far superior to the OPTICAL MICRO-ACTUATOR. The LIGHT TRIGGERED LIGHT SWITCH should be granted patent protection.

2. The last words of Claim 10 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"containing at least one of a driving fluid and an optical fluid, and the means of modifying the volume of the chamber comprise means (80) of compressing the bladder."

There can be one optical fluid because the other optical fluid is the gas above it in the cavity so there is an interface between two. Figure 11 shows a lever that is pushed down on the bladder to push the interface between the two optical fluids in the cavity into the path of the light signals moving along the optical channels. The interface between two optical fluids is never mentioned in the patent application for the LIGHT TRIGGERED LIGHT SWITCH.

The LIGHT TRIGGERED LIGHT SWITCH closed down the dimensions of the optical channel until the dimensions do not allow the passage of the light signal. This is a very different method of switching the signal. The LIGHT TRIGGERED LIGHT SWITCH should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 11:

The words of the Claim 11 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a mixture of liquids."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of the interface between two optical fluids being pushed around so that light will bounce off of it as is illustrated in Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 of Divoux et. al., U.S.P. Application No. 20040091201. The reason there is no mention of the interface between two optical fluids in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different. The LIGHT TRIGGERED LIGHT SWITCH closes down the dimensions of the light channel so that the light signal can no longer pass through it.

OPTICAL MICRO-ACTUATOR Claim 11.

1. The first words of Claim 11 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 1, comprising at least one first chamber (40) in fluid relation with the cavity (30) and at least one second chamber (40a, 41) in fluid relation with the cavity"

Divoux et. al., U.S.P. Application No. 20040091201 functions by the forcing of the interface between two optical fluids in the cavity up and down to interfere with the light passing through the light of the optical channels that passes through the cavity. This claim is for sending the light in the light channel through two interactions with the interface between two optical fluids seen in Figure 15. This is completely different from the opening and closing of the optical channel as the piezoelectric element responds to the electric field of the light in the channel that is claimed in the claims of patent application 10/732,857.

2. The last words of Claim 11 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"and in which the means of modifying the volume of the chamber comprise at least one deformable membrane (44, 45) forming a wall of at least one chamber."

The deformable membrane is made to move by applying a voltage. How is this voltage applied? Paragraph 0003 states that a control signal is used. How is this control signal turned on? Nowhere in Divoux et. al., U.S.P. Application No. 20040091201 is the voltage of light mentioned, while in patent application 10/732,857 the LIGHT TRIGGERED LIGHT SWITCH the section called DETAILED

DESCRIPTION OF THE INVENTION, the second sentence teaches that the electric field of the light acts upon the piezoelectric material to make the switch actuate. From that second sentence on through mathematical calculations with the Poynting vector equation, that is used to explain the way the electric field of the light in the channel actuates the piezoelectric material causing it to expand or contract, and on into the description of each drawing, the light power is triggering the switching. The control signal of the OPTICAL MICRO-ACTUATOR will be supplied from a switch like a transistor that will switch slower than that is a billionth of a second. The voltage of light used by the LIGHT TRIGGERED LIGHT SWITCH will switch faster than one hundred billionth of a second, which is much faster than the OPTICAL MICRO-ACTUATOR witch does not use the voltage of light to switch.

LIGHT TRIGGERED LIGHT SWITCH Claim 12:

The words of Claim 12 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims two and three were more than one wall of the switch is piezoelectric material that responds to the electric field of the light in the channel turning the switch on and off."

This claim teaches that the LIGHT TRIGGERED LIGHT SWITCH is actuated by the power of light passing through the light channel; the index of refraction is not involved, as the piezoelectric material responds. The OPTICAL MICRO-ACTUATOR, patent 20040091201, never mentions the electric field of the light in the waveguides. However, the refraction index change or optical index change that

occurs when the interface between two optical fluids is force into the cavity as Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 show is the key to how the OPTICAL MICRO-ACTUATOR works, and clearly different.

OPTICAL MICRO-ACTUATOR Claim 12.

The words of Claim 12 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

" Micro-actuator according to claim 11, comprising a vent duct (49) connecting the second chamber (40a) in fluid relation with the cavity, to a chamber (47) located on one side of the membrane (44) opposite the cavity (30)."

This claim allows the gas that is the top optical fluid in Figure 16 to equalize with the gas below the membrane that is moved to shift the interface between the bottom optical fluid in Figure 16 in the cavity (30) so that the light in the optical channel will interact with the interface. In patent application 10/732,857 the LIGHT TRIGGERED LIGHT SWITCH an interface between the piezoelectric material and the light channel that it pushes into in response to the voltage of the light in the channel is mentioned several times. The interface between two optical fluids and the interface between an opaque piezoelectric solid and the transparent optical channel are very different. The interface between the optical fluids is moved by a control signal and the piezoelectric responds to the voltage of a light signal. Control signals are slower than light signals. Light signals are more than 100 times faster. Light signals may be as much as 10,000 times faster. The claims of the LIGHT TRIGGERED

LIGHT SWITCH are different from the OPTICAL MICRO-ACTUATOR and should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 13:

The words of Claim 13 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims one, two, and three were the piezoelectric material responds to power level of the light in the channel turning the switch on and off."

This claim teaches that the power level of light passing through the light channel actuates the LIGHT TRIGGERED LIGHT SWITCH; the index of refraction is not involved, as the piezoelectric material responds. The OPTICAL MICRO-ACTUATOR, patent 20040091201, never mentions the electric field of the light in the waveguides. However, the refraction index change that occurs when the interface between two optical fluids is force into the cavity as Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 show is the key to how the OPTICAL MICRO-ACTUATOR works, and is very different than the way that the LIGHT TRIGGERED LIGHT SWITCH works.

OPTICAL MICRO-ACTUATOR Claim 13.

1. The first words of Claim 13 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Micro-actuator according to claim 11, in which each chamber comprises a deformable membrane (44, 45) "

The deformable membrane moves and pushes the optical interface between two optical fluids so that the interface moves into the light signal in the optical channel to transmit, reflect, refract, or attenuate the light signal. This patent application never claims or mentions "on or off" or "on and off" functions as patent application 10/732,857 the LIGHT TRIGGERED LIGHT SWITCH DOES. The LIGHT TRIGGERED LIGHT SWITCH CLOSES down the dimensions of the optical channel so light will not pass through it. It shuts off the light signal. This is different from the OPTICAL MICRO-ACTUATOR.

2. The last words of Claim 13 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"moved by an electrostatic motor."

The question is what actuates the electrostatic motor? The answer is in paragraph 0003 of Divoux et. al., U.S.P. Application No. 20040091201. The answer is a control signal. Control signals can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster at a one hundred billionth of a second. The electrostatic motor actuated by a control signal of the OPTICAL MICRO-ACTUATOR is slower and inferior to the light actuated LIGHT TRIGGERED LIGHT SWITCH.

LIGHT TRIGGERED LIGHT SWITCH Claim 14:

The words of Claim 14 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims one, two and three where the light that accomplishes the switching of the light signal in the channel is imposed upon a conductor near the light channel with the signal that is switched in it."

This claim teaches that the LIGHT TRIGGERED LIGHT SWITCH is actuated by the light signal passing near the light channel, the index of refraction is not involved, as the piezoelectric material responds to the light signal actuating the switch. The OPTICAL MICRO-ACTUATOR, patent application 20040091201, uses the change of the refractive index when the interface between two optical fluids as is pictured in Figures 1, 2A, 2B, 8, 9, 10, 11, 12, 13, 14, 15, and 16 of Divoux et. al., U.S.P. Application No.20040091201, is pushed around so that light will be transmitted, reflected, refracted, or attenuated. The two switches function completely differently.

OPTICAL MICRO-ACTUATOR Claim 14.

The words of Claim 14 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Optical mixer comprising a plurality of optical micro-actuators conform with claim 1."

As we have shown repeatedly, a single OPTICAL MICRO-ACTUATOR works differently and much slower than a LIGHT

TRIGGERED LIGHT SWITCH, but if a plurality of slow switches is run together, the result will be even slower. The speed and superiority of the LIGHT TRIGGERED LIGHT SWITCH will be truer for a plurality of OPTICAL MICRO-ACTUATORS than it is for single OPTICAL MICRO-ACTUATORS.

OPTICAL MICRO-ACTUATOR Claim 15.

1. The first words of Claim 15 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Use of a micro-actuator according to claim 1, in a component chosen from among optical relays,"

Divoux et. al., U.S.P. Application No. 20040091201 can be used as a optical relay by having the light coming into the cavity reflected by the interface between two optical fluids into another optical channel. The light then can be diverted into the second channel or not by the OPTICAL MICRO-ACTUATOR. The method of action is the movement of the interface between two optical fluids, and the movement is turned on by a control signal. LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 light is shut off from passing through the light channel because it is closed down to a dimension too small for the light to pass in response to the voltage of light signal. Different from the interaction between light and the interface between two optical fluids, and a response to a light signal is very different from a control signal. Light signals can be switch on and off more than 100 times faster than a control signal.

2. The next words of Claim 15 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"optical extinguishers,"

Divoux et. al., U.S.P. Application No. 20040091201 can be used as an optical extinguisher when the interface between two optical fluids is moved in the cavity to interfere with the light passing through as Claim 1 teaches. The OPTICAL MICRO-ACTUATOR fluids interact so that the light does not pass on to the next optical channel, but instead is caused to stop in the cavity not passing on. The LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 in it's Claim 1 teaches that the physical dimensions of the channel are closed down to extinguish the light. These are two very different functions. Further, the movement of the interface in the OPTICAL MICRO-ACTUATOR is in response to a control signal mentioned in paragraph 0003. While in the LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 light is shut off from passing through the light channel because it is closed down to a dimension too small for the light to pass in response to the voltage of light signal. Nowhere in the OPTIBCAL MICRO-ACTUATOR is the voltage or power of the light signal mentioned. Again, two very different ways of functioning between these two patent applications.

3. The next words of Claim 15 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"optical switches"

Divoux et. al., U.S.P. Application No. 20040091201 can be used as an optical switch when the interface between two optical fluids is moved in the cavity to interfere with the light passing through as Claim 1 teaches. The OPTICAL MICRO-ACTUATOR fluids interact

so that the light is switched from passing on in one channel to pass on to a different optical channel. The LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 in it's Claim 1 teaches that the physical dimensions of the channel are closed down to extinguish the light. These are two very different functions. Further, the movement of the interface in the OPTICAL MICRO-ACTUATOR is in response to a control signal mentioned in paragraph 0003. While in the LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 light is shut off from passing through the light channel because it is closed down to a dimension too small for the light to pass in response to the voltage of light signal. Nowhere in the OPTIBCAL MICRO-ACTUATOR is the voltage or power of the light signal mentioned. Again, two very different ways of functioning between these two patent applications.

4. The last words of Claim 15 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"and optical attenuators."

Divoux et. al., U.S.P. Application No. 20040091201 can be used as an optical switch when the interface between two optical fluids is moved in the cavity to interfere with the light passing through as Claim 1 teaches. The OPTICAL MICRO-ACTUATOR fluids interact so that some of the light is adsorbed by one of the optical fluids or the interface between the optical fluids while passing on in optical channel. The LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 never mentions that the light can be attenuated or adsorbed by the switch. These are two very different functions. Further, the movement of the interface in the OPTICAL MICRO-ACTUATOR is in response to a control signal mentioned in

paragraph 0003. While in the LIGHT TRIGGERED LIGHT SWITCH of Patent Application 10/732,857 light is shut off from passing through the light channel because it is closed down to a dimension too small for the light to pass in response to the voltage of light signal. Nowhere in the OPTICAL MICRO-ACTUATOR is the voltage or power of the light signal mentioned. Using a control signal dooms the OPTICAL MICRO-ACTUATOR to operating slower than the LIGHT TRIGGERED LIGHT SWITCH. Again, two very different ways of functioning between these two patent applications.

OPTICAL MICRO-ACTUATOR Claim 16.

1. The first words of Claim 16 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Method for making an optical micro-actuator comprising the following steps: formation of a fluid chamber (40) on a first substrate (60) comprising a first electrode (144),"

The significance of the first electrode is that it is were the control signal voltage is applied to actuate the OPTICAL MICRO-ACTUATOR. Where the LIGHT TRIGGERED LIGHT SWITCH is actuated by a light signal's voltage. The will be slower than 10^{-9} seconds the can be more than one hundred times faster, and with the correct wavelength choices the LIGHT TRIGGERED LIGHT SWITCH can be ten thousand times faster than the OPTICAL MICRO-ACTUATOR would be using a control signal voltage.

2. The next words of Claim 16 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"formation of at least one optical channel (12, 14) on a second substrate (64) and etching a cavity (30) separating two parts of the optical channel, assembly of the first substrate (60) and the second substrate, making the cavity coincide with the chamber, release of part of the first substrate, through a back face, to form a membrane (44) and expose the first electrode transfer of a third substrate (46, 48) comprising a second electrode (46) on to the first substrate, the third substrate being transferred onto the first substrate through shims (62) allowing movement of the membrane (44)."

The cavity coinciding with the chamber with a membrane for a wall allows an optical fluid with a surface in the cavity that will move up and down when the membrane is moved. The surface of the optical fluid is the interface of the two optical fluids that affects the light in the channel to be reflected, refracted, attenuated, or adsorbed. This way of functioning is different from and inferior to the action of the LIGHT TRIGGERED LIGHT SWITCH, WHICH shuts off light in a channel by making the channel dimensions too small as a piezoelectric element responds to the voltage in a light signal. Nowhere in claim 16 of patent application 20040091201 is a piezoelectric element mentioned.

OPTICAL MICRO-ACTUATOR Claim 17.

The words of Claim 17 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Method according to claim 16, in which use is made of a first substrate comprising a solid silicon part (60), and of a stack on this solid part, said stack comprising an electrical isolating layer (62) and a non-isolating layer (144) in which: the fluid chamber is

formed in a layer of material (42) covering the said stack, and when the membrane is released, the solid part of the first substrate is eliminated and at least one layer of the stack of layers is kept as a membrane, the non-isolating layer of the stack forming an electrode fixed to the membrane."

Electrical isolating layers and non-isolating layers are need for the OPTICAL MICRO-ACTUATOR to work because it is actuated by a control signal unlike the LIGHT TRIGGERED LIGHT SWITCH which is actuated by the voltage in a light signal.

OPTICAL MICRO-ACTUATOR Claim 18.

The words of Claim 18 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Method according to claim 16, in which an open chamber (40) is formed in a layer of material (42) of the first substrate and the said chamber is closed when the first and second substrates are assembled."

This closure allows the optical fluid to be contained and the interface moved by pressure. Again different from a piezoelectric element responding to the power of a light signal. The OPTICAL MICRO-ACTUATOR is different in form and function from the LIGHT TRIGGERED LIGHT SWITCH.

OPTICAL MICRO-ACTUATOR Claim 19.

The words of Claim 19 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Method for making a micro-actuator in a structure formed of a stack of layers, comprising the following steps: formation of at least one fluid chamber in the structure, with a rear part of the chamber comprising a first electrode, release of the part of the rear part of the chamber thus formed to make a membrane and to expose the first electrode, formation of at least one optical channel in the structure and making a cavity separating at least two parts of the optical channel, the cavity being coincident with the chamber, formation of a second electrode facing the first electrode, this second electrode enabling movement of the membrane."

The electrodes mentioned in this claim are energized to actuate the OPTICAL MICRO-ACTUATOR switch by a control signal mentioned in paragraph 0003. No mention of a piezoelectric element is made in this claim. The LIGHT TRIGGERED LIGHT SWITCH is not actuated by a control signal turned on by an electric circuit as the OPTICAL MICRO-ACTUATOR is, but the voltage of a light signal actuates it. The inventions are very different.

OPTICAL MICRO-ACTUATOR Claim 20.

The words of Claim 20 in the OPTICAL MICRO-ACTUATOR patent application are as follows:

"Method for making the optical micro-actuator, the method comprising the following steps: formation of at least one fluid chamber in a first substrate with a first layer comprising the first electrode and a second layer comprising the second electrode, these

two electrodes being separated by an isolating layer, formation of at least the said optical channel in or on a second substrate and etching a cavity separating at least two parts of the optical channel, assembly of the first substrate and the second substrate, making the cavity coincide with the chamber, release of part of the first layer comprising the first electrode to form a membrane, by etching part of the isolating layer from the rear face of the first substrate."

The fluid chamber holds one optical fluid that has a top surface with the gas above it which is the second optical fluid that forms the interface between two optical fluids that is moved up and down by action of the membrane that is one chamber wall. The control signal voltage applied to the electrodes actuates the membrane. The movement of the interface of the two optical fluids in the cavity is the way Divoux et. al., U.S.P. Application No. 20040091201 teaches that the OPTICAL MICRO-ACTUATOR works. On the other hand, patent application 10/732,857 teaches that a piezoelectric element closes down an optical channel by responding to the voltage of a light signal. These applications describe very different ways their respective arts function. Divoux et. al., U.S.P. Application No. 20040091201 teaches that the OPTICAL MICRO-ACTUATOR has electrodes that control signals are applied. The switching on and off of these control signals (paragraph 0003) could be switched by a manual switch, relay, solenoid, or transistor must switch an electrical signal or "control signal." The fastest of these is the transistor, which can switch in a billionth of a second (10^{-9} seconds). In the LIGHT TRIGGERED LIGHT SWITCH, the light in the channel crosses the switch dimensions in 10^{-13} seconds or faster depending on the size of the switch. Making the LIGHT TRIGGERED LIGHT SWITCH far superior in design.

Conclusion:

Please consider the arguments presented here. Please let the claims of patent application 10/732,857 be allowed.

Thank you for your time and effort.

Claims discussion vs 20040037708

Introduction:

In this document, the claims given in Patent Application 10/732,857 entitled the LIGHT TRIGGERED LIGHT SWITCH will be shone to be unique and different from the claims given in United States Patent Application number 20040037708 entitled the WORKING-FLUID MOVING DEVICE. In brief, THE LIGHT TRIGGERED LIGHT SWITCH is an on/off switch, and uses the power of light in or near the channel to actuate the switch, and the WORKING-FLUID MOVING DEVICE is a switch using an applied voltage to push a fluid around that does not use the power of the light in or near the channel to actuate the switch. The following Table 1 allows a comparison of the two inventions.

Compare	20040037708	10/732,857
Not same	No transparent piezoelectric mentioned	Transparent piezoelectric is claimed
Not same	No light or optical channel	Light channels in Claims and Drawings
Not same	An electrical voltage is applied to actuate the switch	A light channel that closes in time as the piezoelectric material swells under the action of the electric field of light
Not same	Shiny fluid is not in the way	Channel is large enough for light to pass
Not same	Shiny fluid is in the way	Channel is too small so light is stopped
Not same	Applied voltage	Power of the electrical field of light
Not same	Drawn as an electrical switch	Never depicted as an electrical switch
Not same	Working-fluid is pushed by voltage applied to a piezoelectric/electrostrictive film	Piezoelectric material responds to light power to change the dimensions of the channel
Notes	Applied voltage switching speed slower than 10^{-9} sec.	Light faster than 10^{-11} seconds
Notes	Present technology, no advantage	More than 100 times faster, much better

Table 1.

The discussion below works with the words of each patent clearly exposing the differences between these two inventions so that the superior technology of the LIGHT TRIGGERED LIGHT SWITCH may receive the patent protection that it disserves.

Claims discussion:

LIGHT TRIGGERED LIGHT SWITCH Claim 1:

1. The first words of Claim 1 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light in a channel"

In the WORKING-FLUID MOVING DEVICE patent application, it is said that the device can be configured to serve as an on-off switch in paragraph 0121. Nowhere in the claims of patent application 20040037708 of Marahiro Murasato et al. is on-off switch or on and off switch mentioned. Nowhere in the WORKING-FLUID MOVING DEVICE, patent application is a light channel mentioned. No optical wave-guide or optical channel is shown in any of the drawings associated with patent application 20040037708.

2. The second words in Claim 1 in the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"a channel comprising a transparent piezoelectric light channel"

Nowhere in patent application 20040037708 is a transparent piezoelectric light channel mentioned. A "piezoelectric/electrostrictive" film is mentioned many times, but it

puts pressure on the working fluid. It does not have to be transparent since they are not part of the light channel or wave-guide as is claimed in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH. The term "transparent piezoelectric" is never used in the WORKING-FLUID MOVING DEVICE patent application.

In paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be what actuates the piezoelectric/electrostrictive film. Voltages can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster being able to switch in a one hundred billionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is different than and superior to the WORKING-FLUID MOVING DEVICE.

3. The next words in Claim 1 of the disclosure of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"light channel that is made
A larger in cross section
B smaller in cross section"

Light channels or wave-guides are not mentioned in patent application 20040037708, which teaches WORKING-FLUID MOVING DEVICE.

Element 50, 60, and 70 in Figures 7A and 7B, 8A and 8B, and 9A and 9B respectively represent the WORKING-FLUID MOVING DEVICE as an electrical switch not an optical switch as figures 10A and 10B, 11A and 11B, 12A and 12B, and Figure 13 do as well. No drawing in patent application 20040037708 depicts any optical channel or optical wave-guide. This trench is not a light channel or wave-guide as it is in the LIGHT TRIGGERED LIGHT SWITCH.

4. The next words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"by the action of the electric field of light passing through the channel"

Nowhere in the claims of patent application 20040037708 is the electric field of light or its voltage or power mentioned.

In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH the DETAILED DESCRIPTION OF THE INVENTION, the second sentence teaches that the electric field of the light acts upon the piezoelectric material to make the switch actuate. From that second sentence on through mathematical calculations with the Poynting vector equation, that is used to explain the way the electric field of the light in the channel actuates the piezoelectric material causing it to expand or contract, and on into the description of each drawing, the light power is triggering the switching.

By actuating a switch with the electric field of the light, switching speeds of less than one hundred billionth of a second 10^{-11} can be achieved. By actuating a switch by the "voltage is applied" of the WORKING-FLUID MOVING DEVICE, switching speeds of a billionth of a second 10^{-9} are the fastest that can be achieved.

5. The next words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows in the A and B portions:

"A by opening to the passage of the light signals
B by closing to the passage of the light signals"

The claims for patent application 20040037708 do not mention light signals. In paragraph 0002, patent application 20040037708 mentions that WOKING-FLUID MOVING DEVICE CAN be used to switch optical paths, but none of the claims mention an optical path. None of the figures for the WORKING-FLUID MOVING DEVICE illustrate an optical path. This switch changes electrical signals; it does not close to the passage of light signals, as does the LIGHT TRIGGERED LIGHT SWITCH. In paragraph 0021 and 00127 of patent application 20040037708 a description of how the WORKING-FLUID MOVING DEVICE could be use as an optical display element, but not an optical switch. In paragraph 0021 and 0127 optical display uses of the WORKING-FLUID MOVING DEVICE ARE mentioned, but with the fluid described as mercury or gallium alloy as claim 7 teaches clearly transmitting or processing optical signals is not the intent of patent application 20040037708 as it is for the LIGHT TRIGGERED LIGHT SWITCH. One can figure a way the mercury or gallium alloy of the WORKING-FLUID MOVING DEVICE WILL reflect a light signal, and be an optical switch. The patent application does not describe this, but this is very different in action from the LIGHT

TRIGGERED LIGHT SWITCH. In paragraph 0195 of patent application 20040037708 a description of how the WORKING-FLUID MOVING DEVICE COULD be used as an optical position detector but no description of the optical switch use is found. The patent applications describe very different devices.

6. The last words in Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH are as follows in the A and B portions:

"A for the switch to be in the on condition
B for the switch to be in the off condition."

The switch being described is an on and off switch. The WORKING-FLUID MOVING DEVICE IS an on and off switch, but it is for electrical signals. There is one mention of the WORKING-FLUID MOVING DEVICE being used for a switch for optical paths in paragraph 0002, but no claim or figure mentions optical paths. Element 50, 60, and 70 in Figures 7D, 8C, and 9C respectively represent the WORKING-FLUID MOVING DEVICE AS an electrical switch as figures 11B, 12B, and Figure 13 do as well.

WORKING-FLUID MOVING DEVICE Claim 1:

1. The first words of Claim 1 in patent application 20040037708 read as follows:

"A working-fluid moving device comprising a first working fluid, a second working fluid, and a housing body including a channel and housing the first working fluid and the second working fluid in the channel;"

The channel mentioned here is not an optical channel but a channel (number 13) with two electrodes (numbered 11d) and mercury or gallium alloy (numbered 14) make the contact or are pushed so the metal is not making contact. In the disclosure, this is called the switch in the driven state. The first working fluid is divided by the action of its inferior wetting of the walls and the pinching of the channel getting smaller. The whole object of the WORKING-FLUID MOVING DEVICE is to pinch down the channel where the mercury or gallium alloy is separated so that electrical contact is lost between the electrodes or terminals, while the LIGHT TRIGGERED LIGHT SWITCH teaches how the electric field of the light can shut off the light passing through the switch.

2. The second words of Claim 1 in the WORKING-FLUID MOVING DEVICE are as follows:

"wherein the housing body includes a deformable portion in which at least a portion of a wall of the channel is deformable so as to cause a change in a sectional shape of the channel,"

This channel is full of the two working fluids. The first one (numbered 14) of which is mercury or gallium alloy. This channel is deformable so that the first working fluid (numbered 14) that is wetting the walls less that is electrically conductive can be divided into two. This will break the electrical path between the two electrodes or terminals (numbered 11d). The switch will be closed or open for electrical conductivity. In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH one finds described the wall of the wave-guide closes in to shut off the light signal (Figure 1B, 2B, and 3B).

3. The next words of Claim 1 in the WORKING-FLUID MOVING DEVICE are as follows:

"and houses the first working fluid and the second working fluid such that, when the deformable portion is in a first state, the first working fluid is substantially in contact with a portion of an inner wall surface of the channel, the portion corresponding to the deformable portion, and the second working fluid is substantially in contact with the remaining portion of the inner wall surface of the channel;"

The first working fluid (numbered 14) is the one that wets the wall of the channel less and is electrically conductive. This is seen in Figure 1. In this state, the electrodes connect electrically through the first working fluid, which is mercury, or a gallium alloy as is noted in Claim 7. Used in an optical switch mode the light would reflect off the center of the switch when the first working fluid (mercury or gallium alloy) was in the center of the switch and when pushed out the light would pass into the switch. The LIGHT TRIGGERED LIGHT SWITCH is composed of an optical channel that is closed down to too small a dimension for the light to pass through. The light passes through the large channel and does not pass through the channel that is made too small. These switches function very differently.

4. The next words of the Claim 1 in the WORKING-FLUID MOVING DEVICE are as follows:

"the first working fluid and the second working fluid are selected such that the first working fluid is inferior to the second working fluid in wettability to the inner wall surface of the channel;"

The wettability of the first and second working fluids is important because when the channel is closed down the first working fluid separates into two as is seen in Figure 2. This is called the driven state, which is pictured in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. This breaks the electrical connection between the two electrodes or terminals labeled 11d (Fig.1&2), 41a1 (Fig. 5), 53 and 54 (Fig.7), 62 and 63 (Fig. 8), and 72 (Fig.9), and puts the switch in the open condition. In the LIGHT TRIGGERED LIGHT SWITCH, wettablity is never mentioned. Mercury or gallium alloy are never mentioned. When the WORKING-FLUID MOVING DEVICE is being used to switch light signals one must guess the light is reflected by the liquid metal or the metal is moved out of the way so that no reflection occurs. The patent application for the WORKING-FLUID MOVING DEVICE does not describe how the switch could be used as a fiber optic switch. In the LIGHT TRIGGERED LIGHT SWITCH, light in or near to the wage-guide or light channel is of sufficient power to cause the piezoelectric material in the switch to change dimensions so that the light can no longer pass through the channel. That is as is claimed in Claims 1, 2, and 3 of the LIGHT TRIGGERED LIGHT SWITCH. Clearly, these switches described in patent application 20040037708 and those in application 10/732,857 function completely differently.

5. The next words of Claim 1 in the WORKING-FLUID MOVING DEVICE are as follows:

"and when the deformable portion in the first state is deformed to assume a second state different from the first state, the first working fluid is moved by means of a repulsive force induced by the

inferior wettability of the first working fluid to the inner wall surface of the channel."

It is the first working fluid of patent application 20040037708 that is in the center of the channel to reflect or is moved to the sides by its wettability being inferior so it will move to the ends of the channel and not reflect the light signal. This is not described in the patent application, but one can infer it from the descriptions of Optical Display Element uses of the WORKING-FLUID MOVING DEVICE described in paragraphs 0021 and 0127. In Application 10/732,857 Claims 3, 9, 10, 11,and 12, there is a portion of the wave-guide that is filled with a compressible fluid that is not compressed or is compressed depending on the light acting on the piezoelectric element in the switch pictured in Figure 3A and 3B. In the WORKING-FLUID MOVING DEVICE, the first working fluid is pressured by the walls of the channel (not a light channel) to separate into two, breaking the electrical connection provided by it between the electrodes or terminals numbered 11d, 41a1, 53, 54, 62, 63, or 72. The first working fluid being separated into two is also called the driven state in the descriptions of the drawings paragraphs 0033, 0034, 0036,0038, 0041, 0043, 0045, 0048, 0051, and 0054. The driving of the device is by an applied voltage. In paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be what actuates the piezoelectric/electrostrictive film. Voltages can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor

circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second (10^{-9}), then the mercury of the first working fluid must move. A hundred millionth (10^{-8}) or a ten millionth (10^{-7}) of a second is the fastest that the WORKING-FLUID MOVING DEVICE can hope to switch. The LIGHT TRIGGERED LIGHT SWITCH is turned on or off by the electric field of light. The LIGHT TRIGGERED LIGHT SWITCH will switch faster than a hundred billionth of a second (10^{-11}) at the slowest. The LIGHT TRIGGERED LIGHT SWITCH can switch in a ten trillionth of a second (10^{-13}), if one chooses the proper wavelength to do the switching. Clearly, these switches function completely differently.

LIGHT TRIGGERED LIGHT SWITCH Claim 2:

1. The first words of Claim 2 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light in a channel comprising a channel next to a piece of piezoelectric material"

This part of Claim 2 clearly states "An on and off switch for light" The WORKING-FLUID MOVING DEVICE is a switch for electrical circuits. The WORKING-FLUID MOVING DEVICE can be used to reflect light or not reflect light if the wall of the channel is made transparent to let the light hit the mercury or gallium alloy, but the patent application 20040037708 never mentions an optical channel or optical wave-guide. The switch described in Claim 2 has no transparent piezoelectric member that carries the light. The piezoelectric member is next to a transparent material that is carrying the light signal, and the light that causes the piezoelectric member to change shapes and closes the channel down. The

piezoelectric material used may be transparent, but there are less expensive piezoelectric materials that are not transparent that can be used in a switch that is made as this claim describes. The channel that closed down in patent application 20040037708 is a channel containing mercury or gallium alloy. When the channel closes down for the WORKING-FLUID MOVING DEVICE light signals are not prevented because the channel is small, but the mercury or gallium alloy is forced to separate in the middle by applying a voltage to piezoelectric/electrostrictive. In paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be what actuates the piezoelectric/electrostrictive film. Voltages can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster being able to switch in a one hundred billionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is different from the WORKING-FLUID MOVING DEVICE and superior to it.

2. The second words in Claim 2 in the LIGHT TRIGGERED LIGHT SWITCH are as follows:

"where the channel carrying the light is made

A. larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material
B. smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

In the switch described here, as the one described in Claim 1, the light signal is stopped from passing through the switch because the electric field of light in the wave-guide or channel is causing the piezoelectric material of the switch to move. The movement of the piezoelectric material opens up or closes down the channel to the light. This opening or closing, causes the on or off of the switch, because light cannot go through a channel that is as small as a quarter of its wavelength. The switch described in patent application 20040037708 squeezes mercury or gallium alloy (Claim 7) to separate the electrically conductive metal and open the circuit through the switch. One can envision a way this metal could be used to accomplish the reflection of the light for use as an optical switch, but no description of this is given.
These are two very different means of switching. The LIGHT TRIGGERED LIGHT SWITCH will switch faster than a hundred billionth of a second. The WORKING-FLUID MOVING DEVICE will not be able to achieve switching in less than a billionth of a second. In this switch, the wave-guide that is made smaller as the piezoelectric material gets bigger must be made out of a flexable material so that it can respond to the pressure of the piezoelectric material.

3. The next words in Claim 2 of the disclosure of the Light Triggered Light Switch are as follows:

"A. that by contracting opens the light carrying channel to light signals causing the on condition
B. that by expanding into the light carrying channel closes the light channel to light signals"

Murasato et. al., U.S.P. application No. 20040037708, which teaches WORKING-FLUID MOVING DEVICE, has a channel that is made smaller by action of a piezoelectric/electrostrictive, but the channel is not an optical channel. It has two fluids in it. One of these fluids is mercury or gallium alloy. No light can pass through this channel. Application 11/732,857 has piezoelectric material that in a very short time change their dimensions to close off a light channel. The WORKING-FLUID MOVING DEVICE is actuated by a voltage being applied while the LIGHT TRIGGERED LIGHT SWITCH changes diameter with time when the light of sufficient power passes through it. These are two very different means of operation, and Application 11/732,857 is superior because it can switch more than 100 times faster.

4. The next words in Claim 2 of the disclosure of the LIGHT TRIGGERED LIGHT SWITCH are as follows:

> "A. causing the on condition
> B. causing the off condition"

The LIGHT TRIGGERED LIGHT SWITCH claims to be an on/off switch for light signals. Nowhere in the claims of patent application number 20040037708 is a description of the WORKING-FLUID MOVING DEVICE functioning as a light signal switch. The LIGHT TRIGGERED LIGHT SWITCH stops light from continuing down a wave-guide or channel. The WORKING-FLUID MOVING

DEVICE breaks an electrical circuit from one electrode or terminal to another. From discussions in paragraph 0021 and 00127 of optical display element uses of the one can guess that the mercury or gallium alloy could reflect optical signals or not reflect optical signals in different switch states, but no description of the switch in use a light signal switch in light channels or optical wave-guides is given.

WORKING-FLUID MOVING DEVICE Claim 2:

1. The first words in Claim 2 of Murasato et al., U.S.P. application No 20040037708 read as follows:

"A working-fluid moving device comprising a first working fluid, a second working fluid, and a housing body comprising at least a pair of opposed walls and housing the first working fluid and the second working fluid in a channel formed by the paired, opposed walls;"

This claim deals with a channel filled with a first and second working fluids. This channel is not an optical channel for according to claim 7 one of the working fluids does not allow light to pass being mercury or gallium alloy which are opaque and reflective liquid metals. The three independent claims in patent application 11/732,857 all teach light in a channel or a light signal in a channel. These two patent applications cannot be the same if one has opaque materials in the channel it claims while the other has transparent channels for light to pass through and be switched in them.

2. Next words in Claim 2 of Murasato et al., U.S.P. application No 20040037708 read as follows:

"wherein the housing body includes a deformable portion in which at least a portion of the paired walls of the channel is deformable so as to cause a distance between the paired walls to change between a first distance and a second distance shorter than the first distance,"

The distance between the walls becomes smaller to cause the first working fluid which (numbered 14) has poorer wettability to divide into two breaking the electrical connection between the electrodes or terminals (numbered 11d (Fig.1&2), 41a1 (Fig. 5), 53 and 54 (Fig.7), 62 and 63 (Fig. 8), and 72 (Fig.9). The first working fluid is a liquid metal mercury or gallium alloy (Claim 7). The channel getting smaller does not cause the light signal to shut off as the action of the piezoelectric element in the LIGHT TIRGGERED LIGHT SWITCH does. The light channel becomes smaller in the LIGHT TRIGGERED LIGHT SWITCH by the action of the voltage of a light signal that is of sufficient power, while the channel with the mercury in it of the WORKING-FLUID MOVING DEVICE is made smaller by the application of a voltage. In paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be this voltage in the WORKING-FLUID MOVING DEVICE will be switched on or off by some means previously invented like a hand switch, a solenoid, a relay, or a transistor. The fastest of these is a transistor, which can at the fastest switch in a billionth of a second (10^{-9}), then the mercury of the first working fluid must move. A hundred millionth (10^{-8}) or a ten millionth (10^{-7}) of a second is the fastest that the WORKING-FLUID MOVING DEVICE

can hope to switch. The LIGHT TRIGGERED LIGHT SWITCH is turned on or off by the electric field of light. The LIGHT TRIGGERED LIGHT SWITCH will switch faster than a hundred billionth of a second (10^{-11}) at the slowest. The LIGHT TRIGGERED LIGHT SWITCH can switch in a ten trillionth of a second (10^{-13}), if one chooses the proper wavelength to do the switching. The LIGHT TRIGGERED LIGHT SWITCH is clearly superior to the WORKING-FLUID MOVING DEVICE and should be granted patent protection.

3. Next words in Claim 2 of Murasato et al., U.S.P. application No 20040037708 read as follows:

"and houses the first working fluid and the second working fluid such that, when the distance between the paired walls at the deformable portion assumes the first distance, the first working fluid is substantially in contact with portions of inner surfaces of the paired walls, the portions corresponding to the deformable portion, and the second working fluid is substantially in contact with the remaining portions of the inner surfaces of the paired walls;"

This part of this claim is describing the first working fluid in the center position of the switch the on position for it is touching both electrodes or terminals and the switch will conduct electricity. The WORKING-FLUID MOVING DEVICE is actuated by the application of a voltage on a wire. The LIGHT TRIGGERED LIGHT SWITCH has no electrodes no mercury or gallium alloy. The LIGHT TRIGGERED LIGHT SWITCH does not conduct electricity at any time. The LIGHT TRIGGERED LIGHT utilizes the voltage of light and has no transistor turning on the voltage to a wire. The

WORKING-FLUID MOVING DEVICE has no light channels or optical wave-guides. These are very different inventions.

4. Next words in Claim 2 of Murasato et al., U.S.P. application No 20040037708 read as follows:

"the first working fluid and the second working fluid are selected such that the first working fluid is inferior to the second working fluid in wettability to the inner surfaces of the paired walls of the channel; and when the deformable portion is deformed such that the distance between the paired walls changes from the first distance to the second distance, the first working fluid is moved by means of a repulsive force induced by the inferior wettability of the first working fluid to the inner surfaces of the paired walls"

This part of this claim is describing the first working fluid separated to the ends of the channel of the switch the off position for not connecting the electrodes or terminals and the switch will not conduct electricity. The WORKING-FLUID MOVING DEVICE is actuated by the application of a voltage on a wire. The LIGHT TRIGGERED LIGHT SWITCH has no electrodes no mercury or gallium alloy. The LIGHT TRIGGERED LIGHT SWITCH does not complete and interrupt an electrical circuit at any time. The LIGHT TRIGGERED LIGHT utilizes the voltage of light and does not depend on a transistor turning on the voltage to a wire. The WORKING-FLUID MOVING DEVICE has no light channels or optical wave-guides. These are very different inventions.

LIGHT TRIGGERED LIGHT SWITCH Claim 3:

1. The first words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"An on and off switch for light signals in a channel comprising a compressible fluid portion of the channel with a side that is composed of a piezoelectric material"

The arguments for this claim are the same as for Claim 2. The difference is that the material of the wave-guide that the piezoelectric part moves into a compressible fluid instead of compressing a solid. Figure 3 A and B show the compressible fluid before and during response to the electric field of the light in the channel. No mercury or gallium is divided or moved in the LIGHT TRIGGERED LIGHT SWITCH where in the WORKING-FLUID MOVING DEVICE as seen in Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B the first working fluid is separated so that it does not provide an electrical path form one electrode or terminal to the other. The speed of the LIGHT TRIGGERED LIGHT SWITCH comes from the response of the piezoelectric crystal to the electric field of the light. The reason the WORKING-FLUID MOVING DEVICE is so much slower is that signals switched in transistors or slower mechanisms must mechanically or thermally push the first working fluid (mercury or gallium alloy as claim 7 makes clear) to effect the switching. The LIGHT TRIGGERED LIGHT SWITCH is more than 100 times faster.

2. The second words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"piezoelectric material that responds to the electric field in the light in the channel to

A. Contract the piezoelectric wall of the channel to open up

B. Expanding into the light channel to close"

As is illustrated in Figures 3A and 3B the LIGHT TRIGGERED LIGHT SWITCH associated with Application 10/732,857 uses the response of piezoelectric material to the electric field of light to open up or close down the dimensions of the light channel so that light can pass through it or is too small for the light to pass through it. As is illustrated by Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B of the WORKING-FLUID MOVING DEVICE which is has been given patent number 20040037708 the switching of the electrical path is effected by the manipulation of the first working fluid away from the electrodes or terminals of the switch. These are two different mechanisms. The LIGHT TRIGGERED LIGHT SWITCH shuts off light in an optical channel while the WORKING-FLUID MOVING DEVICE breaks an electrical circuit formed by the first working fluid, which is mercury or gallium, alloy. The speed with which invention described in Application 10/732,857 can switch the signal off is much faster than the invention described in patent number 20040037708 can, because the electric field of light is switching the LIGHT TRIGGERED LIGHT SWITCH. The WORKING-FLUID MOVING DEVICE depends upon an "applied voltage" which is turned on by a hand switch, solenoid, relay, or transistor to send electricity to push the first working fluid (mercury) around. The transistor switch would be the fastest at 10^{-9} seconds (that is a billionth of a second). The signal then must cause piezoelectric material to put pressure on the mercury or gallium alloy (claim 7). These operations make the switch slower than the transistor.

Actually the speed that this switch will only be able to switch at 10^{-7} seconds (that is a ten millionth of a second). The LIGHT TRIGGERED LIGHT SWITCH will switch faster than 10^{-11} seconds (that is a hundred billionth of a second). If the proper wavelength is used the LIGHT TRIGGERED LIGHT SWITCH could switch at 10^{-13} seconds (that is a ten trillionths of a second). It is seen that the LIGHT TRIGGERED LIGHT SWITCH is not the same as the WORKING-FLUID MOVING DEVICE, and the LIGHT TRIGGERED LIGHT SWITCH is superior and should be granted patent protection.

3. The last words of Claim 3 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

A. " the channel to larger dimensions so that the light signal easily passes through the channel causing the on condition.
B. the light channel to smaller dimensions so that the light signal may not pass through the channel causing the off condition."

These words show that the way that the LIGHT TRIGGERED LIGHT SWITCH turns off the light is by the dimensions of the channel is wider to let the light through or the dimensions of the channel is smaller to stop the light from passing through the channel. It is pointed out in the DETAILED DESCRIPTION OF THE INVENTION section of Application 10/732,857 that when a light channel or waveguide is shrunken to a given dimension then light of 8056 angstroms will no longer pass through it. Lights of shorter wavelength can still pass through it. The 8056 angstrom or longer wavelength light would be the one that is the signal that is switched on or off. The light that is doing the switching could be shorter wavelengths that can still pass and their electric field is effecting the change in dimensions by acting on the piezoelectric material.

This specific example is given to teach that the light of specific wavelength and power will switch on or off a signal in an other specific wavelength. Light is fast and is capable of turning on or off a light signal much faster than the first and second working fluid machinations described in Murasato et. al., U.S.P. Application No.20040037708 Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B.

WORKING-FLUID MOVING DEVICE Claim 3:

Claim 3 in Murasato et al., U.S.P. No 20040037708 read as follows:

"A working-fluid moving device according to claim 1 or 2, wherein the housing body is configured such that a plurality of deformable portions are formed on a single channel and such that, when each of the deformable portions is deformed, the first working fluid which is substantially in contact with the inner wall surface of the channel at the deformable portion is moved by means of the repulsive force."

This claim teaches that the switch could be made in such a configuration that plurality of electrical switches can be formed with the first working fluid contacting or not contacting the terminals. The mechanism that this claim describes is different from the mechanism described in the claims of The LIGHT TRIGGERED LIGHT SWITCH, which involve light of various wavelengths causing piezoelectric material to change dimensions. Claims 4, 5, 6 and 12, 13, and 14 for the LIGHT TRIGGERED LIGHT SWITCH are about light of various wavelengths influencing piezoelectric material to effect the switch action.

LIGHT TRIGGERED LIGHT SWITCH Claim 4:

The words of the Claim 4 in LIGHT TRIGGERED LIGHT SWITCH read as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light, which is the same wavelength as the light signal in the channel that is switched on and off."

This claim teaches that light that is sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be of the same wavelength as the light signal that is in the channel that the switch is used to turn on or shut off. The electric field of light is never mentioned in Murasato et al., U.S.P. Application No 20040037708. The power of light is never mentioned in Murasato et al., U.S.P. No 20040037708. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be expected from a piezoelectric element from a specific power of light in watts. Clearly, these are different inventions.

WORKING-FLUID MOVING DEVICE Claim 4:

The words of Claim 4 in Murasato et al., U.S.P. Application No 20040037708 read as follows:

"A working-fluid moving device according to any one of claims 1 to 3, wherein the first working fluid is an incompressible fluid, and the second working fluid is a compressible fluid."

The WORKING-FLUID MOVING DEVICE has a channel that is filled with the first and second working fluids. The first working fluid according to Claim 7 is mercury or gallium alloy. A channel full of mercury or gallium alloy is not an optical channel or an optical wave-guide. This switch does not have a channel that closes down by the action of the electric field of light on a piezoelectric element as the LIGHT TRIGGERED LIGHT SWITCH does. Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B of the WORKING-FLUID MOVING DEVICE show clearly that the signal being switched is an electrical one not a optical one. Figures 1A, 1B, 2A, 2B, 3A, and 3B show that the light signals in the LIGHT TRIGGERED LIGHT SWITCH travel along the light switch that is actuated by the movement of the piezoelectric element acted upon by the electric field of the light in the wave-guide. These switches operate on completely different principals.

LIGHT TRIGGERED LIGHT SWITCH Claim 5:

The words of Claim 5 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light, which is a shorter wavelength than the light signal in the channel that is switched on and off."

This claim teaches that light that is sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be a shorter wavelength than the light signal that is in the channel that

the switch is used to turn on or shut off. The electric field of light is never mentioned in Murasato et al., U.S.P. Application No 20040037708. The power of light is never mentioned in Murasato et al., U.S.P. Application No 20040037708. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be expected from a piezoelectric element from a specific power of light in watts. The voltage of the light at a power is calculated along with the change in the piezoelectric element. Clearly, these are different inventions.

WORKING-FLUID MOVING DEVICE Claim 5.

1. The words of Claim 5 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 4, wherein the first working fluid is liquid, and the second working fluid is vapor of the first working fluid."

The WORKING-FLUID MOVING DEVICE has a channel that is filled with the first and second working fluids. The first working fluid according to Claim 7 is mercury or gallium alloy. A channel full of mercury or gallium alloy is not an optical channel or an optical wave-guide. This switch does not have a channel that closes down by the action of the electric field of light on a piezoelectric element as the LIGHT TRIGGERED LIGHT SWITCH does. Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B of the WORKING-FLUID MOVING DEVICE show clearly that the signal being switched is an electrical

one not a optical one. Figures 1A, 1B, 2A, 2B, 3A, and 3B show that the light signals in the LIGHT TRIGGERED LIGHT SWITCH travel along the light switch that is actuated by the movement of the piezoelectric element acted upon by the electric field of the light in the wave-guide. These switches operate on completely different principals.

LIGHT TRIGGERED LIGHT SWITCH Claim 6:

1. The first words of Claim 6 of the LIGHT TRIGGERED LIGHT SWITCH application read as follows:

"A light switch as claimed in claims one, two, or three that is actuated by the power of the switching light,"

This claim teaches that light that is sufficient power to trigger the switching the LIGHT TRIGGERED LIGHT SWITCH may be a shorter wavelength than the light signal that is in the channel that the switch is used to turn on or shut off. The electric field of light is never mentioned in Murasato et al., U.S.P. Application No 20040037708. The power of light is never mentioned in Murasato et al., U.S.P. Application No 20040037708. In the LIGHT TRIGGERED LIGHT SWITCH of Application 10/732,857 in the BEST MODE FOR CARRING OUT THE INVENTION, section the Poynting vector equation is used to calculate the exact response to be expected from a piezoelectric element from a specific power of light in watts. Clearly, these are different inventions.

2. The next of Claim 6 of the LIGHT TRIGGERED LIGHT SWITCH application reads as follows:

"which is a longer wavelength than the light signal in the channel that is switched on and off"

This claim teaches that the light signal that is switched on or off can be switched on or off by a light signal that is longer in wavelength. Claim 4 and 5 teach that the light signal that is switched on or off can be switched on or off by a light signal that is the same or a shorter wavelength than the light signal that is being switched on or off. This switching by light is the key advantage of this the Application 10/732,857, which teaches LIGHT TRIGGERED LIGHT SWITCH. Light is so much quicker than control signals. Patent number 20040037708 is turned on or off the application of a voltage as is seen in paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be what actuates the piezoelectric/electrostrictive film. Voltages can be switched on and off by a hand actuated switch, an electromagnetic solenoid, a relay, or a transistor circuit. The fastest of these would be the transistor circuit, which can switch at 10^{-9} seconds in the best conditions. This is one billionth of a second. Many devices use transistors to switch and they only achieve 10^{-7} seconds because of the mechanical responses to the signal that the transistor provides. This is a ten millionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is much faster being able to switch in a one hundred billionth of a second. The LIGHT TRIGGERED LIGHT SWITCH is different than and superior to the WORKING-FLUID MOVING DEVICE. These two inventions are very different in their action.

WORKING-FLUID MOVING DEVICE Claim 6.

1. The words of Claim 6 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 5, wherein the first working fluid is a liquid metal."

This Claim shows clearly that the channel in the drawings of the WORKING-FLUID MOVING DEVICE is not an optical channel as the channels are in Patent Application 10/732,857, which teaches LIGHT TRIGGERED LIGHT SWITCH. A liquid metal will not allow light signals to pass. This is very different mechanism than is described in Claims 1, 2, and 3 of the LIGHT TRIGGERED LIGHT SWITCH that teach that the physical dimensions of the light channel are opened up or closed off by the action of the electric field of the light on piezoelectric elements. The LIGHT TRIGGERED LIGHT SWITCH is very different from the WORKING-FLUID MOVING DEVICE and should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 7:

The words of Claim 7 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim one where the piezoelectric material is transparent to the light passing through it."

There are many materials mentioned in Application 10/732,857 that are piezoelectric these are quartz (SiO_2), lithium niobate ($LiNbO_3$), lead zirconate ($PbZrO_3$), lead titanate ($PbTiO_3$), and lead zirconate titanate. Lead zirconate titanate is also called PZT. Of these lithium niobate and quartz are transparent. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the light channel is composed of transparent piezoelectric material and changes dimensions as the switching light signal acts upon it as Figures 1A and 1B illustrate. Nowhere in Patent, application 20040037708 is a transparent piezoelectric element mentioned. Nowhere in Patent application 20040037708 does a light channel change physical dimensions. Patent application 20040037708 does not show any light channels.

WORKING-FLUID MOVING DEVICE Claim 7.

The words of Claim 7 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to claim 6, wherein the liquid metal is mercury or a gallium alloy. "

This claim makes clear that the action of the WORKING-FLUID MOVING DEVICE is manipulating a conductive liquid metal to switch electrical signals delivered to the electrode or terminals. This is not how the LIGHT TRIGGERED LIGHT SWITCH works. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"light channel that is made
A larger in cross section by opening to the passage of the light signals

B smaller in cross section by closing to the passage of the light signals"

In Claim 2 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"where the channel carrying the light is made
A.larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material
B.smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

In Claim 3 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"A. Contract the piezoelectric wall of the channel to open up
B. Expanding into the light channel to close"

The two switches function differently. Patent application 20040037708 teaches the moving of mercury or gallium alloy, while Application 10/732,857 teaches the optical wave-guide is physically made large enough or pinched down to be too small to turn on or shut off the light.

LIGHT TRIGGERED LIGHT SWITCH Claim 8:

The words of Claim 8 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a gas"

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of a liquid mental being moved around so that light will bounce off of it as is illustrated in Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B of the WORKING-FLUID MOVING DEVICE show clearly that the signal being switched is an electrical one not a optical one. The reason there is no mention of a liquid mental in the application of the LIGHT TRIGGERED LIGHT SWITCH is that the function of the two switches is completely differently.

WORKING-FLUID MOVING DEVICE Claim 8.

The words of Claim 8 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 7, further comprising an actuator for generating a force which causes deformation of at least a portion of a wall of the deformable portion, wherein at least the portion of the wall to be deformed is a diaphragm."

Murasato et. al., U.S.P. Application No. 20040037708 speaks often of the first working fluid, which is moved to a position by the walls of the channel. The first working fluid is a liquid metal or mercury or gallium alloy. The movement of the walls is accomplished by the voltage that is applied. The switching function of the WORKING-

FLUID MOVING DEVICE is controlled by the voltage applied that moves the wall and moves the working fluid. This claim teaches that the moving wall can be a diaphragm. Once the first working fluid is divided, it no longer provides electrical continuity between the electrodes or terminals (11d) and the switch is in the off position. This is very different from what Application 10/732,857 describes as the function of the switch that it teaches. In Claim 1 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"light channel that is made
A.larger in cross section by opening to the passage of the light signals
B.smaller in cross section by closing to the passage of the light signals"

In Claim 2 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"where the channel carrying the light is made
A. larger in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material
B. smaller in cross section by the action of the electric field of the light in the channel on the piece of piezoelectric material"

In Claim 3 of the LIGHT TRIGGERED LIGHT SWITCH the words are as follows:

"A. Contract the piezoelectric wall of the channel to open up
B. Expanding into the light channel to close"

The two switches function differently. Patent application 20040037708 teaches the moving of working fluids that are mercury or gallium alloy, while Application 10/732,857 teaches the optical wave-guide is physically made large enough or pinched down to be too small to turn on or shut off the light.

LIGHT TRIGGERED LIGHT SWITCH Claim 9:

The words of Claim 9 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a mixture of gases."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of mercury or gallium alloy being pushed around so that light will bounce off of it. The reason there is no mention of mercury or gallium alloy in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different.

WORKING-FLUID MOVING DEVICE Claim 9.

The words of Claim 9 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 7, wherein deformable walls of the deformable portion comprise a pair of opposed diaphragms; and a pair of actuators are fixedly attached to the corresponding diaphragms."

In this claim, opposed diaphragms and actuators are noted. The purpose they serve is to push on the working fluids and separate them as Figures 1and 2, 3A and 3B, 4A and 4B, 5B and 5C, 6A and 6B, 7B and 7C, 8A and 8B, and 9A and 9B of the WORKING-FLUID MOVING DEVICE show. The working the first working fluid can be liquid mental (Claim 6) or mercury or gallium alloy (Claim 7). The channel that has these opposed diaphragms is not an optical channel as the channels are in Patent Application 10/732,857. The LIGHT TRIGGERED LIGHT SWITCH has not liquid metal or mercury. The LIGHT TRIGGERED LIGHT SWITCH has not electrodes or terminals. The actuators mentioned in Claim 9 would be supplied a the application of a voltage as is seen in paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the words "voltage being applied" are used. In paragraphs 0138, 0150, 0153 the words "application of voltage" are used. In paragraph 0156, the words "voltage must be applied" are used. The voltage would be what powers the actuators. The LIGHT TRIGGERED LIGHT SWITCH on the other hand uses the voltage in the power of light. In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH the DETAILED DESCRIPTION OF THE INVENTION, the second sentence teaches that the electric field of the light acts upon the piezoelectric material to make the switch actuate. From that second sentence on through mathematical calculations with the Poynting vector equation, that is used to explain the way the electric field of the light in the channel actuates

the piezoelectric material causing it to expand or contract, and on into the description of each drawing, the light power is triggering the switching. An applied voltage of the WORKING-FLUID MOVING DEVICE can be turned on by a hand switch, a solenoid, or a transistor. The fastest of these is the transistor at 10^{-9} seconds. The voltage of light used in the LIGHT TRIGGERED LIGHT SWITCH can switch in 10^{-13} seconds. The LIGHT TRIGGERED LIGHT SWITCH is clearly superior and should be granted patent protection.

LIGHT TRIGGERED LIGHT SWITCH Claim 10:

The words of Claim 10 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a liquid."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of a mercury or gallium alloy (Claim 7) being pushed around so that light will bounce off of it. The reason there is no mention of mercury in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different.

WORKING-FLUID MOVING DEVICE Claim 10.

The words of Claim 10 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to claim 8 or 9, wherein the actuator comprises a film-type piezoelectric element including a piezoelectric/electrostrictive film or an antiferroelectric film."

The WORKING-FLUID MOVING DEVICE uses piezoelectric elements as does the LIGHT TRIGGERED LIGHT SWITCH, but the WORKING-FLUID MOVING DEVICE actuates the piezoelectric by applying a voltage while the LIGHT TRIGGERED LIGHT SWITCH use the electric field in a light signal.

LIGHT TRIGGERED LIGHT SWITCH Claim 11:

The words of the Claim 11 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claim three where the compressible fluid is a mixture of liquids."

Figure 3A and 3B of the LIGHT TRIGGERED LIGHT SWITCH application show the area that the piezoelectric part of the switch responds to the electric field of the light to open or close. Claim 8 teaches that the area that the piezoelectric part can be expanding into can be filled with a gas. There is no mention of liquid metal working fluids being pushed around so that light will bounce off of it. Murasato et. al., U.S.P. Application No. 20040037708 use symbols for their switch that show it is a switch for electrical circuits Figures 7D, 8C, 9C, 11B, 12B, and 13 represent the WORKING-FLUID MOVING DEVICE as an electrical switch.

The reason there is no mention of an electrical switching in the LIGHT TRIGGERED LIGHT SWITCH application is that the functions of the two switches are completely different.

WORKING-FLUID MOVING DEVICE Claim 11.

The words of Claim 11 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 8 to 10, wherein the diaphragm is a ceramic diaphragm."

The diaphragm in this claim, which can be ceramic, bends in and divides the first working fluid form in the center of the channel to the ends of the channel. This is called the driven state, which is pictured in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. In this state, the switch does not provide an electrical path between the electrodes or terminals labeled 11d (Fig.1&2), 41a1 (Fig. 5), 53 and 54 (Fig.7), 62 and 63 (Fig. 8), and 72 (Fig.9), and puts the switch in the open condition. This switch is depicted as a switch for electrical signals on a wire. Figures 7D, 8C, 9C, 11B, 12B, and 13 represent the WORKING-FLUID MOVING DEVICE as an electrical switch. This patent application never refers to optical channels or light wave-guides. On the other hand, Patent
Application 10/732,857, which teaches the LIGHT TRIGGERED LIGHT SWITCH, is all about light signals in optical channels not electrical signals on a wire. Nowhere in the application, 10/732,857 are wires depicted. These are two different inventions.

LIGHT TRIGGERED LIGHT SWITCH Claim 12:

The words of Claim 12 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims two and three were more than one wall of the switch is piezoelectric material that responds to the electric field of the light in the channel turning the switch on and off."

This claim teaches that the LIGHT TRIGGERED LIGHT SWITCH is actuated by the power of light passing through the light channel, the channel is not full of liquid metal, mercury or gallium alloy which would not allow light signals to pass. The WORKING-FLUID MOVING DEVICE, patent 20040037708, never mentions the electric field of the light or wave-guides. However, the mercury providing a path for electrical signals for wires is the key to how the WORKING-FLUID MOVING DEVICE works.

WORKING-FLUID MOVING DEVICE Claim 12.

The words of Claim 12 in the WORKING-FLUID MOVING DEVICE patent are as follows:

" A working-fluid moving device according to any one of claims 1 to 11, wherein the deformable portion is formed from ceramic."

The deformable portion of the wall in this claim, which can be ceramic, bends in and divides the first working fluid form in the center of the channel to the ends of the channel. This is called the driven state, which is pictured in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. In this state, the switch

does not provide an electrical path between the electrodes or terminals labeled 11d(Fig.1&2), 41a1 (Fig. 5), 53 and 54 (Fig.7), 62 and 63 (Fig. 8), and 72 (Fig.9), and puts the switch in the open condition. This switch is depicted as a switch for electrical signals on a wire. Figures 7D, 8C, 9C, 11B, 12B, and 13 represent the WORKING-FLUID MOVING DEVICE as an electrical switch. This patent application never refers to optical channels or light wave-guides.

On the other hand, Patent Application 10/732,857, which teaches the LIGHT TRIGGERED LIGHT SWITCH, is all about light signals in optical channel not electrical signals on a wire. Nowhere in the application, 10/732,857 are wires depicted. These are two different inventions.

LIGHT TRIGGERED LIGHT SWITCH Claim 13:

The words of Claim 13 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims one, two, and three were the piezoelectric material responds to power level of the light in the channel turning the switch on and off."

This claim teaches that the LIGHT TRIGGERED LIGHT SWITCH is actuated by the power level of light passing through the light channel; the index of refraction is not involved, as the piezoelectric material responds. The WORKING-FLUID MOVING DEVICE, patent 20040037708, never mentions the electric field of the light in or optical channels. The channel in the WORKING-FLUID MOVING DEVICE is full of electrically conductive metal that is the key to

how the WORKING-FLUID MOVING DEVICE works. The function of these two switches is completely different.

WORKING-FLUID MOVING DEVICE Claim 13.

The words of Claim 13 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 12, wherein the inner wall surface of the deformable portion is formed from ceramic."

The deformable portion of the wall in this claim which can be ceramic bends in and divides the first working fluid form in the center of the channel to the ends of the channel. This is called the driven state, which is pictured in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. In this state, the switch does not provide an electrical path between the electrodes or terminals labeled 11d(Fig.1&2), 41a1 (Fig. 5), 53 and 54 (Fig.7), 62 and 63 (Fig. 8), and 72 (Fig.9), and puts the switch in the open condition. This switch is depicted as a switch for electrical signals on a wire. Figures 7D, 8C, 9C, 11B, 12B, and 13 represent the WORKING-FLUID MOVING DEVICE as an electrical switch. This patent application never refers to optical channels or light wave-guides.

On the other hand, Patent Application 10/732,857, which teaches the LIGHT TRIGGERED LIGHT SWITCH, is all about light signals in optical channel not electrical signals on a wire. Nowhere in the application, 10/732,857 are wires depicted. These are two different inventions.

LIGHT TRIGGERED LIGHT SWITCH Claim 14:

The words of Claim 14 of the LIGHT TRIGGERED LIGHT SWITCH APPLICATION READ as follows:

"A light switch for light signals as claimed in claims one, two and three where the light that accomplishes the switching of the light signal in the channel is imposed upon a conductor near the light channel with the signal that is switched in it."

This claim teaches that the LIGHT TRIGGERED LIGHT SWITCH is actuated by the light signal passing near the light channel, no liquid metal, mercury, or gallium alloy is mentioned, as the piezoelectric material responds to the light signal actuating the switch. The WORKING-FLUID MOVING DEVICE, patent application 20040037708, uses the electrical conductivity of the mercury to switch as is pictured in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left of Murasato et. al., U.S.P. Application No. 20040037708, mercury is pushed around to make the switch function. The two switches function completely differently.

WORKING-FLUID MOVING DEVICE Claim 14.

The words of Claim 14 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 13, wherein the inner wall surface of the deformable portion is

coated with a material whose wettability to the first working fluid is low."

The low wettability coating that this claim deals with highlights again the difference between Patent Application 20040037708 and Patent Application 10/732,857. The low wettability of the first working fluid is what makes it divide when the channel is made small by the walls moving in. This dividing is seen in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. The liquid metal, mercury or gallium alloy divides so it no longer provides a conductor between the electrodes or terminals. This channel is not an optical channel. Patent Application 10/732,857 deals with optical channels made to small for light signals in response to a light signal. Hence, it is called the LIGHT TRIGGERED LIGHT SWITCH. The driven state of the WORKING-FLUID MOVING DEVICE never mentions optical channels or optical wave-guides.

WORKING-FLUID MOVING DEVICE Claim 15.

The words of Claim 15 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 13, wherein the inner wall surface of the deformable portion is modified so as to assume inferior wettability to the first working fluid."

The wall surface modified so as to assume low wettability coating that this claim deals with highlights again the difference between Patent Application 20040037708 and Patent Application 10/732,857.

The low wettability of the first working fluid is what makes it divide when the channel is made small by the walls moving in. This dividing is seen in Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. The liquid metal, mercury or gallium alloy divides so it no longer provides a conductor between the electrodes or terminals. This channel is not an optical channel. Patent Application 10/732,857 deals with optical channels made to small for light signals in response to a light signal. Hence, it is called the LIGHT TRIGGERED LIGHT SWITCH. The driven state of the WORKING-FLUID MOVING DEVICE never mentions optical channels or optical wave-guides.

WORKING-FLUID MOVING DEVICE Claim 16.

The words of Claim 16 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 15, wherein the channel of the housing body is formed as a closed space, and the housing body comprises a volume change absorptive portion for absorbing a change in volume of the closed space associated with deformation of the deformable portion."

This claim is associated with a place for the working fluids to go when they are pushed around. Some adjustment in the volume of the working fluids may be made with the facility that this claim teaches. The working fluid dividing when the channel is made smaller is key to the function of Murasato et. al., U.S.P. Application No. 20040037708 as it is shone in the drawings Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. No dividing of fluid is mentioned in Patent Application 10/732,857 because the

liquids and gasses in the LIGHT TRIGGERED LIGHT SWITCH allow the passage of the light signals that are being switched and the light signals that are causing the switching. While at least one of the working fluids will not allow light to pass through the channel in the WORKING-FLUID MOOVING DEVICE being liquid metal, mercury, or gallium alloy. The channels of these devices have different functions. No mention of an optical channel or wave-guide is made in of Murasato et. al., U.S.P. Application No. 20040037708.

WORKING-FLUID MOVING DEVICE Claim 17.

The words of Claim 17 in the WORKING-FLUID MOVING DEVICE patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 16, wherein deformation of the deformable portion causes the first working fluid in a single mass to break into two or more fluid masses."

The working fluid dividing when the channel is made smaller is key to the function of Murasato et. al., U.S.P. Application No. 20040037708 as it is shone in the drawing Figures 2A, 2B, 3B, 4B, 5C, 6B, 8A right, 8B left, and 9A right, 9B left. No dividing of fluid is mentioned in Patent Application 10/732,857 because the liquids and gasses in the LIGHT TRIGGERED LIGHT SWITCH allow the passage of the light signals that are being switched and the light signals that are causing the switching. While at least one of the working fluids will not allow light to pass through the channel in the WORKING-FLUID MOOVING DEVICE being liquid metal, mercury, or gallium alloy. The channels of these devices

have different functions. No mention of an optical channel or wave-guide is made in of Murasato et. al., U.S.P. Application No. 20040037708.

WORKING-FLUID MOVING DEVICE Claim 18.

The first words of Claim 18 in the WORKING-FLUID MOVING DEVICE
patent are as follows:

"A working-fluid moving device according to any one of claims 1 to 17, wherein the first working fluid is an electrically conductive fluid; the second working fluid is an electrically insulative fluid; and at least a pair of terminals are formed such that, before the deformable portion is deformed, the terminals assume one of an electrically connected state, in which the terminals are electrically connected via the first working fluid,"

The two states that the WORKING-FLUID MOVING DEVICE can be in are described in this claim. These first words focus on the electrically connected state. This switch is depicted as a switch in an electrical circuit in Figures 7D, 8C, 9C, 11B, 12B, and 13. Never is the LIGHT TRIGGERED LIGHT SWITCH depicted as an electrical circuit. It is a fiber optic channel light signal device. It is actuated by light and can switch 10,000 times faster than the WORKING-FLUID MOVING DEVICE. The LIGHT TRIGGERED LIGHT SWITCH is different from and better than the WORKING-FLUID MOVING DEVICE. The LIGHT TRIGGERED LIGHT SWITCH should be granted patent protection.

WORKING-FLUID MOVING DEVICE Claim 18.

The last words of Claim 18 in the WORKING-FLUID MOVING DEVICE
patent are as follows:

"and an electrically disconnected state and such that, after the deformable portion is deformed to cause movement of the first working fluid, the terminals assume the other of the electrically disconnected state and the electrically connected state."

The two states that the WORKING-FLUID MOVING DEVICE can be in are described in this claim. These last words focus on the electrically disconnected state. This switch is depicted as a switch in an electrical circuit in Figures 7D, 8C, 9C, 11B, 12B, and 13. This disconnected state is caused by a voltage that is applied that causes the channel to be smaller. This applied voltage is mentioned in the patent. In paragraphs 0072,0073, 0086, 0087,0094, 0095, 0136, 0148, 0150, 0156, 0164, 0166, the words "voltage is applied" are used. In paragraphs 0092, 0131 the paragraph 0156, the words "voltage must be applied" are used. The LIGHT TRIGGERED LIGHT SWITCH on the other hand uses the voltage in the power of light. In the disclosure of the LIGHT TRIGGERED LIGHT SWITCH the DETAILED DESCRIPTION OF THE INVENTION, the second sentence teaches that the electric field of the light acts upon the piezoelectric material to make the switch actuate. From that second sentence on through mathematical calculations with the Poynting vector equation, that is used to explain the way the electric field of the light in the channel actuates the piezoelectric material causing it to expand or contract, and on into the description of each drawing, the light power is triggering the switching. An applied voltage of the WORKING-FLUID MOVING DEVICE can be turned on by a

hand switch, a solenoid, or a transistor. The fastest of these is the transistor at 10^{-9} seconds. The voltage of light used in the LIGHT TRIGGERED LIGHT SWITCH can switch in 10^{-13} seconds. The LIGHT TRIGGERED LIGHT SWITCH is different from and better than the WORKING-FLUID MOVING DEVICE. The LIGHT TRIGGERED LIGHT SWITCH should be granted patent protection.

WORKING-FLUID MOVING DEVICE Claim 19.

The last words of Claim 19 in the WORKING-FLUID MOVING DEVICE
patent are as follows:

"A working-fluid moving device according to claim 18, wherein a plurality of terminal connection-state changeover elements are formed on a single channel, each terminal connection-state changeover element comprising the deformable portion and the paired terminals."

Nowhere in Murasato et. al., U.S.P. Application No. 20040037708 is a optical channel, optical wave-guide or even a fiber optic mentioned. The switch is only associated with optical signals in four places. That is in paragraphs 0002, 0021, 0127,and 0195. In paragraph 0002, a use is suggested for the WORKING-FLUID MOVING DEVICE of a switch for optical paths, but nowhere in the patent application is it explained how the switch would function. In paragraph, 0021 and 00127 an optical display element is a possible use of the WORKING-FLUID MOVING DEVICE. This function does not turn on and off optical signals in a channel as the LIGHT TRIGGERED LIGHT SWITCH does. In paragraph, 0195 suggests an optical position detector as a use for the WORKING-FLUID

MOVING DEVICE. Again, this is not an on and off switch for optical signals in a fiber optic channel or wave-guide as the LIGHT TRIGGERED LIGHT SWITCH is. In Figures 7D, 8C, 9C, 11B, 12B, and 13 the WORKING-FLUID MOVING DEVICE drawing as a switch for electricity in a wire. These are very different inventions.

Conclusion:

Please consider the arguments presented here. Please let my claims be allowed.

Thank you for your time and effort.